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The Journal

OF THE

Manchester Geographical Society.

* * *

# SOUTH AFRICA.

By the Very Rev. W. S. SWAYNE, B.D. (Dean of Manchester).

(Addressed to the Society in the Geographical Hall on Tuesday, November 4th, 1919.)

THE Dean began by stating that he had been to South Africa twice and had picked up a few ideas of the country. But his knowledge of South Africa was rather limited because on both occasions he went over exactly the same ground; he had never penetrated to any part except Cape Colony, and his remarks would be chiefly about that. Directly you got to Capetown you had set before you at once a specimen of the level of the lower part of the continent—Africa generally was the highest of the continents—and the mean height of the greater part of South Africa was about 3,500 feet. People had compared South Africa to a dish turned upside down; you had a great deal of slope up from the edge and then a big level on the top. Capetown from the sea was one of the most attractive looking towns he had ever seen, but Adderley Street was about the only good street in the town; the other streets were second and third rate. Very few white people lived in Capetown if they could help it; they lived out in the very charming suburbs which stretched out about three miles to Seapoint on the one hand and three miles to Wynberg on the other. Consequently they were not as concerned to make the town as charming as it might be. The people who lived in the town were Malays, Dutch and coloured people, who were really the descendants of the old slave type, partly Dutch and partly Hottentot. They now constituted the greater part of the labour population of

Capetown, and were not such a bad sort of people. One of his friends who had a congregation of them said they were quite pleasant people to work with and he was very happy amongst them.

They did not do a great deal of heavy manual labour, however. That was mostly done by Kaffirs, who used to live where they could, and were too filthy for words, so that when Capetown was threatened with plague the Kaffirs were put into a location outside. Whether or not that still obtained he did not know. The white people of South Africa did not do very much manual labour of any kind if they could help it. "Once, when I was going up country to join the troops, I had a great heavy valise with me I could hardly lift. The platform was very low and the train high, and as the train drew up I saw a white man standing below—a railway official. I said : 'Will you give me a hand down with this?' and he replied : 'If you ask that coloured fellow up the platform I dare say he will attend to you.' 'If you don't give me a hand down with it I'll shy it at your head' I retorted. And so he lent me a hand." Oak trees grew very rapidly at the Cape—one that he thought a hundred years old was only about forty—but they made very poor wood. Returning to Capetown, Dr. Swayne remarked upon the exceptional cleanness of buildings; it provided an illustration of what our own towns might be if only we could get rid of the smoke nuisance. The day would come when they who were children now would see Manchester like that. By means of a series of fine slides the Dean next took his audience for an imaginary bicycle ride round Table Mountain—a pretty run of about forty miles. Seapoint, where there is hardly ever the kind of sea favourable to the launching of a boat, was the first stop, and then on to Hout Bay, a favourite resort of Capetown people in the summer. Hereabouts arum, or pig-lilies as they are called out there, grow very well, and a view of an old Dutch house showed flowers in empty paraffin tins. These old houses, built by the original settlers as they used to build them in Holland, were not very well adapted to the climate, and the modern house had a great big verandah or stoep round it, where the inhabitants practically lived for nine or ten months in the year. Constantia Neck was a district remarkable for its vineyards, and a great deal of good wine was grown there. Some thirty years or more ago the Cape Government had out some vine-growing and wine-making experts from France and Germany, and they very much improved the production of Cape wine. The original Cape wines were pretty filthy, and even now there was a great deal of wine offered there which you would not touch if you were a wise man. There were, however, a claret or burgundy called " Hermitage," and a kind of hock or white wine called " Rackenstein " which were very much preferable to Australian or Californian wines.

He thought they would sell well on the English market if there was any to export, but there was so little made that it all met with a very ready sale. They also made a very nice liqueur at the Cape and a very pleasant table water, so that in the way of wines, liqueurs and table water they provided themselves. Good Cape brandy which, like the wines, was under Government control, was, he thought, of very high class. He tasted some that was given to the men in hospital, and it was all right. But, of course, there was another kind of brandy called " Cape Smoke " which was quite different. This was simply made out of the skins and pips of the grapes, and was very cheap and nasty. The journey proceeded through the suburbs of Capetown, including Wynberg, Newlands, Rosbeck, Rondebosch, and Woodstock, where abundant rain accounts for thoroughly fine vegetation, and on to Groote Schuur, Mr. Cecil Rhodes' private house which he bequeathed to Cape Colony to be the official residence of the Prime Minister. It was built more or less on the old Dutch style though with variations, a number of verandahs or stoôp being introduced. " I think on the whole it is one of the most charmingly equipped houses I ever saw, furnished with good, old-fashioned Dutch furniture, purchased partly in Holland. I don't know whether the ladies present will allow me to go safely out of this room if I say it, but it was a house that no woman had had anything to do with. And the result was that it was not overcrowded with fripperies. You might have called it perhaps a little stiff; you might have looked to see a few things lying about, but, of course, most of our houses are too grossly overcrowded. If you have got beautiful things you cannot see them. It is all false art, overdone." And in this house there were beautiful things, whilst the gardens were on a large scale. The people of Capetown were always allowed to walk about in the grounds, and there were long walks amounting to many miles. Every now and then you came across a cage of lions, or leopards, or jackals, or an enclosure of zebras. There was a regular menagerie in the grounds.

The whole development of South Africa was governed by the fact that the railway, starting from Capetown, did not go up country but proceeded east at once down to Grahamstown and Port Elizabeth. None of the railways went west. Why was that? For the simple reason that the prevailing rains which affected the territory came from the Indian Ocean. The railways reached out to meet the rains. The slides now showed up-country views—the Hex river valley, where was good farming land. "While I was there," said the Dean, "I had about the best green peas I have ever had in my life, which shows that you can grow vegetables of that kind to perfection there. Also there were very good fruit farms. One of these was developd by Mr. Cecil Rhodes, and he would have done a great deal more in that direction had he lived. Cultivation generally, however, was in a primitive state. South Africa was an important outpost of Empire, large in territory but a very small affair really. Apart from German South-west, the British Dominion of South Africa was about seven times as great in area as the whole of the British Isles; the white population when he first went there was about the same as the population of Essex. What it was now he did not know, but he should conjecture less than the population of Staffordshire. There was about one white person to the square mile; in England there were five hundred to the square mile. That would help them to realise how very slight the population of South Africa was. Land under tillage was very small indeed. In Cape Colony, which was rather more tilled than some parts, it was estimated, he thought, that only one-thousandth part of the whole was under tillage, whilst the whole amount of tillage was not much greater in area than that of Anglesey. So that practically, so far as tillage was concerned, South Africa was an undeveloped country. A great deal more might be done than was done if labour was available and was not so dear; also if the question of irrigation could be dealt with. The Dean cited one valley about twenty-two miles long with an average width of about a mile. Down the centre was a water-course, but ordinarily there was not a drop of water in it. During the six months he was there he only saw it once with water in it. Every now and then, however, there were tremendous thunderstorms in the hills.

There was then any amount of water, and all that had to be done in order to irrigate twenty-two square miles of land was to bank it up. There was nothing wrong with the soil; all it wanted was water, but a large sum was needed to build dams and nobody had done it yet. It would, he thought, be some time before it would pay to do it.

Coming to the Great Karroo, the Dean referred to one of the most interesting bits of engineering in South Africa—the Hex River Pass, and on the question of the railways mentioned that though the gauge for the most part was 3 feet 6 inches, the carriages were about as wide as ours, and the authorities managed to run sleepers, first and second class, on the ordinary trains. He admitted it was a bit of a climb getting into the top berth, but it was better than sitting propped up all night, and people did three or four days' travelling without suffering very much. The next slide showed the slopes of the Karroo covered with a tufted bush called mesembryanthemum, which has a blossom like the Michaelmas daisy and makes the hill-side look as pink as an expanse of Scotch heather. They called it, too, Karroo. The horses, cows and sheep ate it, and, in passing, the Dean said that South African mutton was equal to the best Welsh hill mutton. It required a good deal of cooking because it was a bit tough if it was not well cooked. The ordinary estimate was that it took six acres of Karroo to keep one sheep going, so that the farms had to be large. Thus for a thousand sheep they required six thousand acres. Most of the farms ran more than that—twenty or thirty thousand acres—just stones and gravel with this little bush growing. Up on the Karroo there was a certain amount of buck, and a few leopards would be found almost anywhere. Of course, you might live the whole of your life in South Africa and never see a leopard, but shepherds out with sheep often saw them. They were called tigers out there,, and you often heard of a place called "Tiger Kloof," which meant a place where leopards used to haunt. Referring again to the railways, Dr. Swayne said that to a very large extent the South African railways were laid very much as we laid tramways, so that not much pace could be made. The average pace for an express train did not get much over 15 miles an hour, and the difference between an ordinary train and express was that the express did not stop so much.

Trees now began to make their appearance in the views.

They were, said the Dean, a new feature in the South African landscape, and by degrees they would change the whole outlook. They were gum trees, and they were spreading rapidly, being found round every homestead. Personally, he could never get to like the gum tree; it always looked a dilapidated type of nature. Further slides included pictures of a Boer pony—not beautiful, but a good hardy animal—and of the smart type of Dutch farmer.

Proceeding to the more native districts, the lecturer made the statement that wherever you got white men in any numbers the native dwellings seemed to get worse and worse. There was nothing more miserable than the kind of huts the natives used to live in; they were dreadful places. He never knew, for instance, how the Cape Railway could make it consistent with their conscience to let the natives live as they did. They used to make their shanties of a bit of sacking, a bit of corrugated iron, a bit of old coat, a bit of board, anything they could get hold of to shove together. They were full of holes, letting in the weather and wind, and in winter time it was very cold—twenty degrees of frost sometimes for three weeks. The natives of South Africa, however, were very well developed, distinctly fine men. Concluding, the Dean said he had not given them much geography, but he had tried to give them some idea of a country that had a great deal to be said for it, and which was, as yet, almost entirely undeveloped.

The exports of South Africa were wool, feathers, gold, and diamonds; almost everything else it got elsewhere—foodstuffs very largely from Australia; manufactured articles from England; engines from Duff's, Glasgow; electric trams from Pennsylvania. But though the country was undeveloped there were great possibilities in it; it was almost entirely a question of water supply. As to the political future of South Africa who could tell? The Dutch and the English were always sparring, but he always believed there would be no serious difference for several reasons. One was because they always played games together; nothing seemed to prevent that. Another reason was that they inter-married freely; there was no such serious barrier of religion as there was between the French and the English in Canada. But the biggest reason of all, so big that it put all other reasons into the shade absolutely, was that the Dutch and English must pull together because of the natives. The native problem in

South Africa was a tremendous one, particularly as the natives were growing up into a strong, vigorous race, and were increasing more rapidly than the whites. But they were quite unfit to govern themselves, and the real problem of the whole continent was "What is to be done with the native? How are you to be able to introduce them fully into civilised society?" The whole future of the country centred on that problem. That was what was really at the back of the minds of most people in South Africa, and that would prevent them pushing their divergencies of opinion to too great an extent.

# Review.

"Carte ethnographique de la Hongrie." By COUNT PAUL TELEKI. Institut Geographique Hongrois. Budapest, 1919.

IN this ethnographical chart of Hungary, that is the Hungary of pre-war time extent, Prof. Paul Teleki claims to have treated the difficult problem of ethnographical representation by a new and clearer method, one based upon the density of the population as determined by the census of 1910. When we look upon a map of a land like this of Hungary with its extraordinary intermixture of so-called races (there are twelve shown, eleven differentiated by colours and the twelfth for "others") we realise the difficulties to be overcome in the after-war settlement of frontiers, and that those difficulties cannot be readily solved by the method implied in that somewhat cant phrase, "the self-determination of peoples." What constitutes a people? Are race and naionality alternative terms? If not, what is a nation? What is a race? These are questions which arise as we gaze upon the brilliant kaleidoscopic picture presented to our eyes by this map.

The principles upon which the map is constructed would be difficult to explain without a diagram. Prof. Teleki takes the arrondissement as the unit and for each 100 inhabitants gives a square millemetre of colour on the chart. The result is rather like a section of a block of scagliola. It would be a matter of extreme difficulty to test the accuracy of the representation, and the information it purports to convey is not readily intelligible. No doubt, given that the basis of his system be sound, the information is there, but it requires rather close study to get at it.

Apparently the author is unaware of the work of Mr. B. C. Wallis in the development of the contour, or population lines, method: a method which yields much more graphic results. The map of Hungary, by the latter, as illustrated and described in the "Geographical Journal," is in every way superior. Prof. Teleki's method, too in this map seems to give rather undue prominence to the Magyar element in Transylvania which might in some minds lay it open to suspicion of bias or propaganda. H. T. C.

# BRITISH MALAYA: A STORY OF EMPIRE.*

By W. E. Gibbs, D.Sc.

(Addressed to the Society in the Geographical Hall on Tuesday, November 25th, 1919.)

If you look at a map of the Eastern Seas, you will notice that midway between India and China a narrow peninsula juts southward from the continent of Asia to the islands of the East Indies, or, as they are sometimes called, the Islands of the Malay Archipelago (Sumatra, Java, Borneo). The southern half of the peninsula is British Malaya. It is a small country, not quite so large as England, but, like a number of other small countries, it has a big story. It possesses considerable mineral wealth; it is a very fertile country—a land which, "when tickled, laughs itself into harvest."

Singapore, the southernmost point of the peninsula, is ninety miles north of the Equator. It is not only the natural focus for the trade of the surrounding islands, but, as will be seen from the map, it is the centre of the eastern world from which trade routes radiate east to China, Japan and the Pacific ports of America, south to Australia, and west to India and Europe.

The Malay Peninsula is 464 miles long from north to south, and is nowhere wider than 216 miles. A range of mountains runs through the peninsula, some of the peaks rising as high as 7,000 feet. The climate is damp, the rainfall on the west coast varying from 75—120 inches in the year. On the east coast, which is exposed to the fury of the north-east monsoon, the rainfall is about 155 inches per annum. Although the country lies so near to the Equator, the climate is not so hot as might be expected. This is due to the cooling effect of continual breezes from the sea. The mean day temperature is 80°, while the mean night temperature is 70°. There is practically no seasonal variation throughout the year. Except where it is mined or cultivated, the country is covered by dense tropical forest and jungle.

*Historical.* The earliest inhabitants of the peninsula of whom we have any record are a primitive race of people called

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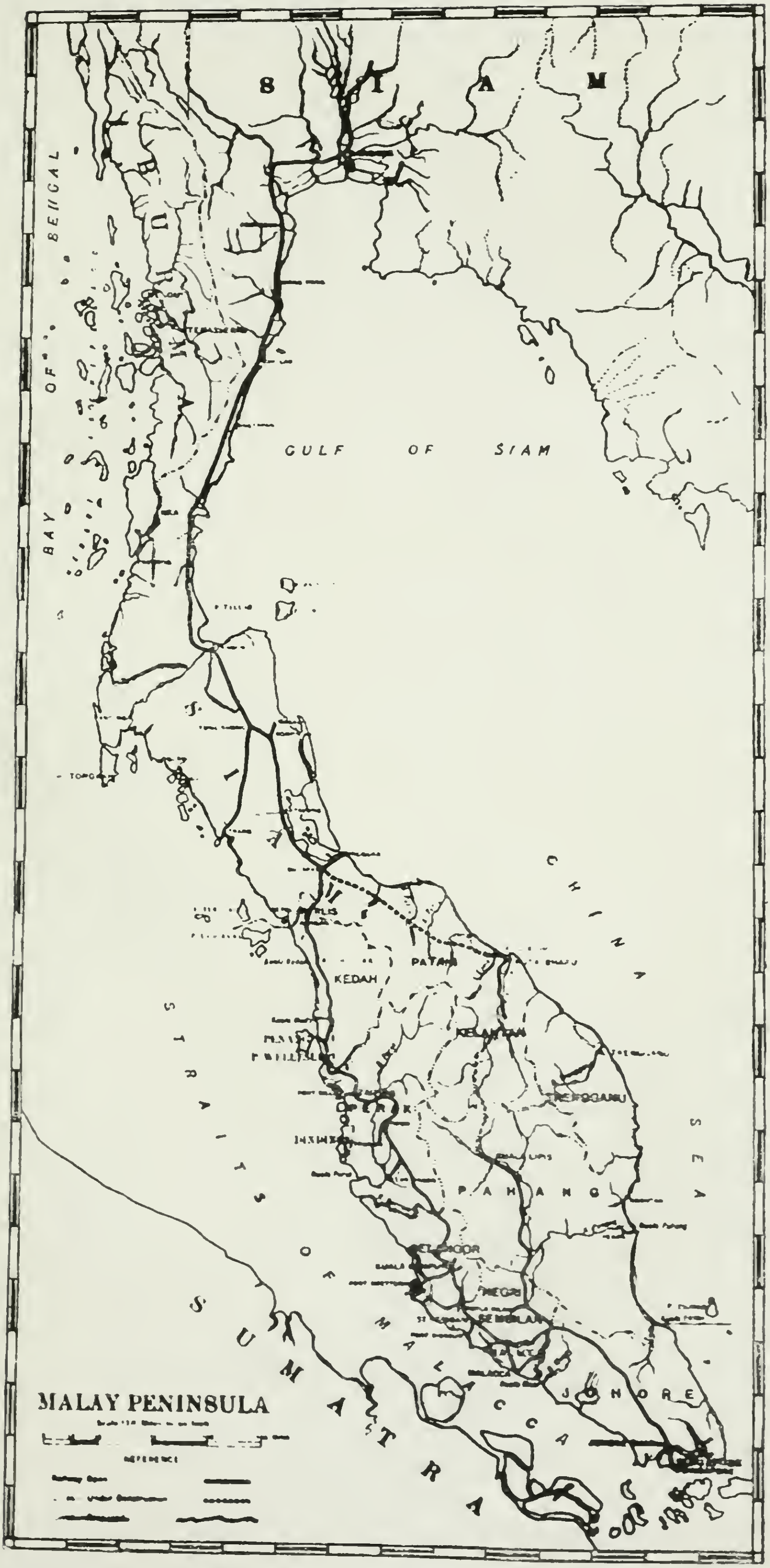

S I A M
B U R M A
BAY OF BENGAL
GULF OF SIAM
S I A M
CHINA SEA
STRAITS OF MALACCA
SUMATRA
PERLIS
PATANI
KEDAH
PENANG
P. WELLESLEY
KELANTAN
PERAK
DINDINGS
TRENGGANU
PAHANG
SELANGOR
NEGRI SEMBILAN
MALACCA
JOHORE
MALAY PENINSULA
REFERENCE

the Sakai. The descendants of these primitive aborigines still dwell in the peninsula, but are rarely seen by the white man. There are a number of different tribes commonly known by that name in the peninsula, and although they differ somewhat in type, they resemble one another in being very primitive people who live in the heart of the jungle and in the hill districts, in houses, or rather, rude shelters made of palm leaves and perched on the tops of high trees.

In 1360, a band of Malays from Sumatra settled in Singapore. Forty years later there was a great invasion of the peninsula by the Javanese. The original Malay settlers were driven out of Singapore, and formed a new settlement in Malacca. This settlement speedily developed into a prosperous kingdom, which, for many years, sent envoys to the court of the Emperor of China. It would appear from the Chinese court records of the fifteenth century that the Chinese were regarded by the Malays of that day much as the British are by their decendants to-day. When this Malay kingdom had been established in Malacca for about one hundred years, the Portuguese, under Albuquerque, the famous Viceroy of India, attacked Malacca and founded trading settlements along the west coast of the Straits of Malacca.

A hundred years later (1606), the Portuguese power in the East was waning, and the Dutch were rapidly becoming the masters of the Eastern Seas. In 1641, Malacca, after many attacks, fell to the Dutch, and henceforth Holland dominated this part of the Eastern World. The Dutch established trading settlements along the coast, and prospered exceedingly.

While all these changes were taking place at various points along the Western coast of the peninsula, the Malays had spread inland and developed into three Native States: Pahang, Johore and Perak, ruled by Malay princes.

The Dutch remained paramount in the Eastern Seas until the end of the eighteenth century.

In 1826, the British East India Company were firmly established along the Western coast of the Peninsula in Penang, The Dindings, Malacca and Singapore.

Fifty years later the East India Company ceased to administer these settlements, and they became a Crown Colony. 'From their position on the shores of the Straits of Malacca they were called the Straits Settlements.

Meanwhile, in the Malay Hinterland, the weak rule of the native princes had produced a condition of anarchy. Piracy was rife and not by any means restricted to the Native States themselves but frequently caused great discomfort to the settlers in the Straits Settlements. A state of anarchy was especially prevalent amongst the large numbers of Chinese miners in the State of Perak, and piracy was the sport and pastime of the young bloods of the court of Selangor. This condition of things naturally restricted the successful development of the British Settlements, and a request was made to the British authorities for strong action to be taken against the Malays.

In 1873-4 a British Expedition was sent up country. After a short campaign, a treaty was signed with the Sultan of Perak at Pangkor by which the Sultan was to "receive and provide a suitable residence for a British Officer to be called Resident who shall be accredited to his court and whose advice must be asked and acted upon in all questions, other than those touching Malay religion and custom." It further provided that "the collection and control of all revenues and the general administration of the country are to be regulated under the advice of the Resident."

British Residents were then appointed to the courts of the Sultans of Perak and Selangor, and an Assistant Resident also was appointed to the Malay territory called Negri Sembilan. In 1881 an Assistant Resident was appointed to the court of the Sultan of Pahang.

The native rulers, after a certain amount of resistance to these new arrangements, settled down quietly, and the new system of government became conspicuously successful.

In 1896, Perak, Selangor, Pahang and Negri Sembilan voluntarily joined in a treaty with Great Britain constituting the Federated Malay States (F.M.S.). This federation of native states is governed by a federal council consisting of the native rulers, their British Residents and the Resident General. The Governor of the Straits Settlements is the British High Commissioner of the F.M.S.

The position in the Peninsula to-day, therefore, is as follows:—The Straits Settlements, including Labuan (1907), belong to Great Britain. The F.M.S. consists of Malay territory ruled nominally by native princes under the "protection" of Great Britain. British protection means direct administration by British officials and complete control in all matters except those affecting the Mahommedan religion.

In the north of the Peninsula there are four other Malay States—Kedah, Kelantan, Trengganu and Perlis, which during the last century were under the suzerainty of Siam. In 1909, Siam ceded to Great Britain her suzerainty over these States. To-day the influence of Great Britain is paramount throughout the Peninsula, and when we speak of British Malaya we speak of the whole of this region of British influence, including the suzerain State of Johore.

*Racial.* The Malay is the natural owner of one of the richest countries in the world, but is seemingly quite indifferent to the fact. He is simple, brave, courteous, with a genius for taking life easily. Amidst all the stir and change of the last forty years, he retains his simple requirements practically unaltered, and, although foreigners from China, India and the West invade his country in search of wealth and power, the Malay still remains practically free from material ambition.

In religion he is Mohammedan, although still retaining many animistic customs and rites. Malay industries are largely organised and controlled by religious experts or witch doctors, called Pawangs, who, by invoking the aid of the appropriate spirits, ensure a successful rice crop or a plentiful haul of fish.

All the hard work of developing the resources of the country has been done by Chinese and Indian labour, mainly under British organisation and direction. So numerous are the Chinese in the Peninsula that one might be forgiven, at first sight, on entering the various towns and villages, for thinking that one were in China. In Singapore and Penang practically all the workers are Chinese, as are also the majority of the shopkeepers and merchants and boatmen. Wherever one goes, signs of the ubiquitous Chinaman arrest the attention.

In the tin-mining district in the north of the Peninsula the population is mainly Chinese. These strangers from the East have brought with them their customs, their habits of life, their conceptions of architecture and their genius for industry and commerce. Some of the most prominent buildings in the Peninsula are Chinese temples, and some of the most impressive events in the daily life of the people are Chinese wedding or funeral processions.

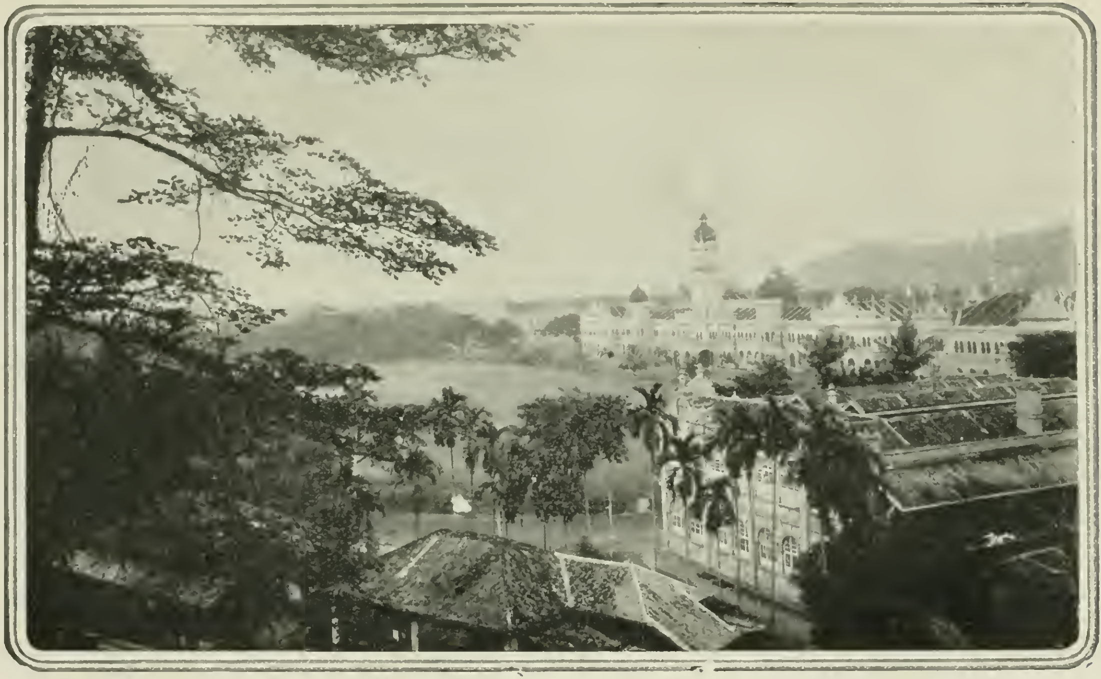
The many varied races of India (Pathans, Tamils, Sikhs and others) are found in the Peninsula in great numbers. They work on the rubber plantations, they are familiar figures in the towns and villages as shopkeepers, money-lenders, clerks, cowkeepers and police.

The Chinese, and the people of India, however, are strangers in the land. The real native is the Malay. The typical Malay is brown skinned, of small stature and has the high cheek-bones and slanting brown eyes of the Mongol. His straight black hair is sleek and glossy with coconut oil, and is generally heavily perfumed, for the Malay, particularly in his youth, is a great dandy. He dresses simply, affecting bright colours. By disposition he is careless, happy, good-natured, but sensitive to insult or affront. At times he is apt to brood over a real or fancied wrong until his mind becomes unbalanced and he runs amok.

The Malay language, or at any rate, as much of it as one needs to know for use in the Peninsula, is easily acquired. It is a simple language; this is very fortunate, for it has become the lingua franca of the Peninsula.

The Malay house is a very simple thing. It is easy to construct and the materials lie close at hand in the jungle. There is no likelihood of any house famine or building difficulties arising in that fortunate country. The house consists essentially of a bamboo framework raised about six feet from the ground on a kind of platform. The walls are made of plaited palm leaf, the roof is made of similar material, and generally has a very steep gable. The furniture of the house is of the simplest, consisting only of some mats, a few bowls and cups made of wood or coconut shell, some nets or traps and a few simple tools. At one end of the house you would notice a kind of low broad shelf. This forms the sleeping place of the family. Some of the houses of the better-class Malays are made of wood instead of palm leaf, and are roofed with red tiles. The woodwork of these houses is often elaborately carved. The Malay house is surrounded by a clearing, in which goats and fowls are reared. A little patch of rice land hard by in the jungle supplies practically all the wants of the family.

The first villages were, no doubt, built along the coast



1.—Kuala Lumpur, 1911.

and along the banks of the rivers. for, in the early days, when the country was covered with thick jungle, the rivers formed the only highway into the interior. Most of these riverside dwelling-houses stand on piles in the water, so that at times of high tide the water washes up almost level with the floors of the houses. From time to time, as the village grows, house is added to house, until the village appears to be floating on the water. This device does away with the need for any drainage system, and no doubt contributes very largely to the remarkably amphibious character of the Malay children. They seem to be as much at home in the water as on the land. One of the most popular diversions of passengers on the steamers passing through Penang or Singapore is to throw coins overboard and watch the brown-skinned babies dive for them in the clear water—they invariably catch the coin long before it reaches the bottom.

A number of Malays live on the rivers in little house-boats. They correspond to our barge population, and trade up and down the rivers from village to village.

> Up to the invention of steam the trade in the Straits of Malacca was much harassed by Malay piratical Prahus which infested the Singapore Straits, the islands, the coast of the Peninsula and the adjacent seas. Piracy was in those days the only career for a Malay of spirit, and it offered all the glorious uncertainties of war, of sport and of commerce. It was no uncommon thing in those days for ships and junks to sail to or from Singapore and no man see them more. Attacked off some river-mouth trading settlement by Malay prahus, rowing thirty aside, often cunningly disguised as fishing boats, or else when becalmed at sea and openly set upon by native craft whose lightness took advantage of the failing breeze, the smaller Chinese, Indian and English trading craft ran risks which to-day seem almost incredible. When overpowered, their crews were either massacred or carried away into slavery, or merely turned adrift, the ships gutted of every article of value and themselves plundered of provisions, of water and even of clothing, to die of starvation, or to make if they could some not inhospitable harbour. The British did what they could to suppress piracy, but until the invention of steam vessels no real suppression was possible.

The first encounter between the paddle steamer "Diana" and a fleet of five pirate boats is on record. When the Malays first sighted the steamer, they thought she was a sailing ship afire, so they joyously sailed towards her, encouraged in the idea that she was helpless by the fact that she lay still and waited for them. The first Malay prahu was allowed to range alongside and there sunk. This did not deter the others, and when the ship afire began to sail towards them against the wind the pirates were horrified at such an unnatural proceeding and began to disperse. The "Diana" caught them up one by one, and —there was a great killing of pirates. (Official Guide.)

*Industrial.* One could spend a great deal of time describing in detail the very interesting arts, crafts and industries of the Malay people, the ceremonies and ritual with which they prepare for the planting of the rice or for the trapping of fish and animals. This story, however, concerns itself more directly with the growth and development of the Peninsula under British rule. Let us consider what are the results of forty years of British influence.

The British, like the old Romans, are great road makers; and road-building is particularly necessary in a country like the Malay Peninsula, covered with jungle. To-day there are over 3,000 miles of good main roads running through the Peninsula from north to south and branching off through all the important industrial and agricultural areas.

A state-owned railway system of 1,000 miles radiates from Kuala Lumpur, the seat of government and the centre of the rubber-growing area, to Penang in the north, Malacca and Port Swettenham on the west coast and Singapore in the south. To-day we can travel by express train throughout the Peninsula for 1½d. a mile, first class. The train is provided with electric light and fans, sleeping accommodation, restaurant cars, lavatories fitted with hot and cold water, and that greatest of all luxuries to the traveller in a hot country—shower baths.

A system of river steamers connects the eastern coast of the Peninsula with its Hinterland.

The three main ports of British Malaya are Penang, Port Swettenham and Singapore. Singapore, in addition to being the chief port of the Peninsula, is the nerve centre of the

2.—A Rich Coconut Tree (Cocus Nucifera).

great ganglion of trading routes which radiate from it to the various ports of the East Indies.

At Singapore there is one of the finest systems of docks in the world, the new graving dock being the largest east of Suez, and the town itself contains many impressive buildings, and, like the other towns in the Peninsula, is spaciously planned.

Kuala Lumpur in 1872 was simply a rough clearing containing a few huts. In that year the Chinese head man of the village bought the heads of his enemies in the market-place. To-day Kuala Lumpur is the seat of government, the centre of the great railway system and also of the rubber growing area, and, architecturally is one of the most beautiful garden cities in the world. All these improvements have necessarily led to a great industrial development in the Peninsula, so that to-day there are four very flourishing industries and a number of others smaller but equally healthy. The four most important industries are rice, coconut, tin and rubber.

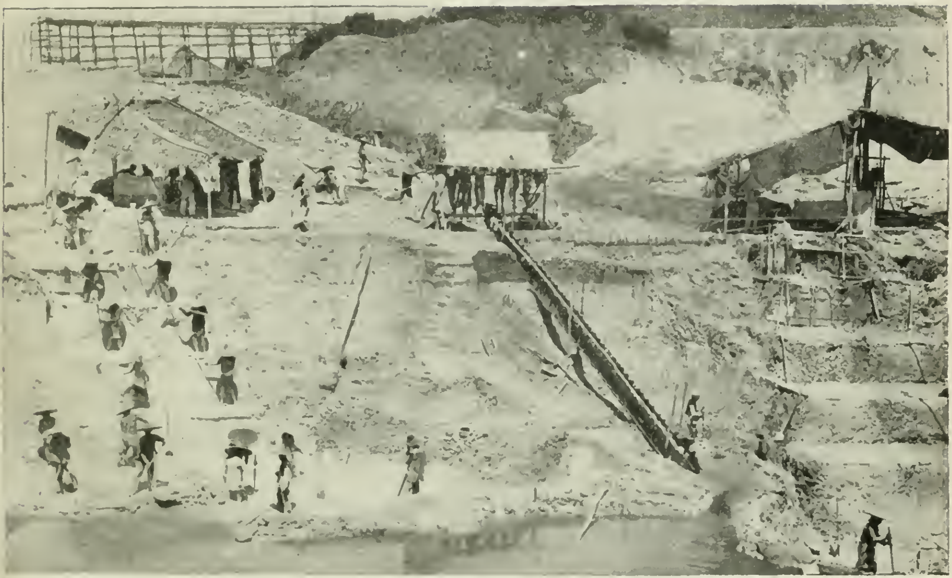
*Rice.* Rice is the staple food of the Malay, and also of the Chinese and Indian races who share the Peninsula with him. Rice growing is, or rather used to be, a somewhat precarious business, for it has to grow in a flooded field for nearly six months, and if, for any reason, the water supply fails and the field dries up, the harvest is ruined. The procedure is as follows: —A piece of land is ploughed. It is then surrounded by a mud wall about one foot high to retain the water with which it is to be flooded. This water is generally obtained from a neighbouring stream or river from which it is raised by a crude water wheel made of bamboo and turned by hand. The water is delivered from the top of the wheel and runs down a wooden gutter to the rice field. (To-day the possibility of the water supply failing is almost completely removed. The Government have constructed large irrigation works at Krian, in the centre of the rice-growing district. Enormous volumes of water are here stored up, to be distributed over the region as required.) After the field has been flooded, the ground is churned up into a thin mud. The young shoots of rice are then taken from the adjoining nursery, four or five shoots at a time, and planted in this mud by the women, until the whole piece of ground is stippled with these little green shoots. The rice grows rapidly, and so do the weeds, so that constant weeding is necessary if the crop is to have anything like a chance. Six months after planting, the rice is ready to ripen, the field is drained, and, a week or two later, harvested. The grain is then beaten out and winnowed. The annual production of rice is about 12,000 tons a year, and is worth £80,000. None of this rice is exported as the home demand is more than the amount produced.

*Coconut* (Copra). The coconut palm is a very familiar sight throughout the length and breadth of the country; apart from its modern industrial importance, it is very valuable to the Malays themselves. It supplies them with food, kitchen utensils, and building materials. It is said that twenty-four coconut palms in full bearing are sufficient to support a Malay family all the year round.

It is chiefly grown in plantations in the north of the Peninsula. The trees are planted about thirty feet apart, and grow best in light sandy soil near the coast. The coconut, as we receive it in this country, is incomplete. In its natural state the nut is covered with a husk of "coir" fibre from two to three inches thick. This is stripped from the nut and used for making coconut matting and other things. The nut is especially grown more for the white meat which it contains. This is dried in the sun and constitutes the "copra" of commerce. It is exported to Europe, and the oil which it contains is extracted and manufactured into such articles as margarine, soap, candles, etc. The copra from which the oil has been removed is used in confectionery as desiccated coconut.

The annual production of copra in Malaya is about 80,000 tons, and is worth £1,500,000.

*Tin*. The Malay Peninsula contains probably the richest tin field in the world. Very extensive deposits of alluvial tin are situated mainly in the valley of the Perak river. In appearance the tin ore resembles shining black sand, and generally occurs intimately mixed with a large quantity of ordinary brown sand. The method of mining is essentially simple. The tin-bearing ground is dug up and raked to and fro in running water. As the brown sand is so much lighter than the black tin sand, the water carries it away and leaves the heavy tin sand behind. This tin sand is collected, dried and sold to the various agents of the large smelting com-



3.—Open-cast Tin Mine, showing Chinese pump.

panies in Penang and Singapore; it is there smelted and the tin obtained from it is exported to Europe and America. "Straits tin" is known throughout the world for its high degree of purity. Approximately 50,000 tons are produced a year, worth from £10,000,000 to £14,000,000. During the last twenty-nine years, 1,300,000 tons of tin have been exported from the Peninsula, of which the value was £167,000,000.

Generally speaking, nearly one-half of the total tin supply of the world is produced in the Malay Peninsula. Many of the workings are owned by Chinamen who still use primitive methods of excavating the ore and "dressing" it. A number of the bigger mines are now owned by English and French companies, who adopt much more up-to-date and economical methods of working.

*Rubber.* Last, but not least in importance or interest, is the rubber industry. Like the other industries described above, the rubber industry is of comparatively recent development. The first rubber estate on any large scale in the Peninsula was planted in 1895. To-day over 1,000,000 acres are planted, yielding annually 100,000 tons of rubber, worth £25,000,000. What this means can best be realised from a brief description of the method of developing a rubber estate. First of all, the jungle is burned down. The charred stumps and roots of the trees are then cleared away and young seedlings from the nursery are planted out about 25 feet apart. During their growth and throughout their life the ground has to be carefully weeded; if the grass and weeds are too thick they hold the rain and the ground becomes so damp that the roots of the young trees are attacked by all kinds of parasitic pests. If, on the other hand, the ground is too bare, heavy rains wash it away and lay bare the roots of the trees. The best solution of the difficulty appears to lie in the direction of cultivating proper cover crops between the trees. The rubber itself is contained in the tree in the form of a milky fluid which bears somewhat the same relation to the rubber of commerce that milk bears to cheese. This milky liquid, called "latex," is contained in long tubular cells which run parallel to the length of the tree in a layer existing between bark and cambium. When the tree is cut with a sharp knife, so that the bark and this latex-bearing layer are penetrated, these tubular cells bleed, the latex oozes out of the cut and runs down the tree into a cup placed to receive it. Every morning, as soon after sunrise as possible, a labourer comes with his sharp "tapping" knife and cuts the thinnest possible paring from the lower edge of the existing cut, so that the tree bleeds again and the latex runs down into the collecting cup. In this way, the tapping of the tree goes on morning after morning until all the bark on one side of the tree up to a certain distance has been removed. The labourer then goes round to the other side of the tree and gathers latex there, leaving the first side to recover. The latex is collected in large cans and is taken to the factory where it is coagulated. The cheese-like curd of rubber is rolled into long thin strips which are cured by being suspended in the resinous smoke from burning wood and coconut shells. The cured rubber is then packed in wooden boxes for export.

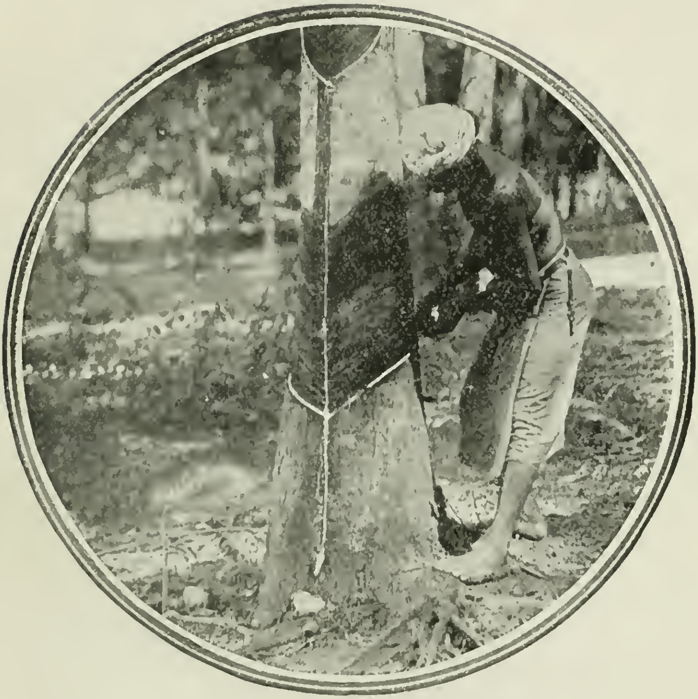
The total trade of the Straits Settlements in 1918 was £153,000,000: imports £81,000,000, and exports £72,000,000.

Exactly one hundred years ago, Sir Stamford Raffles, pioneer and empire builder, realised the strategic importance of the position of Singapore to the rapidly growing commercial interests of Great Britain in the East. He obtained from Johore the island of Singapore, and on February 6, 1819, hoisted the British flag on the site of the ancient maritime capital of the Malays. Writing of this new colony, he says: "Our object is not territory, but trade, a great commercial emporium and a fulcrum whence we may extend our influence politically as circumstances may hereafter require. One free port in these seas must eventually destroy the spell of Dutch monopoly."

To-day Singapore is the greatest port of the Eastern world. It has a population of 300,000, an annual tonnage of 20,000,000 and an annual trade of £80,000,000.

Facing the harbour of Singapore to-day is a long stretch of green playing fields circled by a band of trees behind which rises the tall spire of the cathedral.

Near this wide open space stands a statue of Sir Stamford Raffles looking out across a crowded harbour "where the ships of all the nations bring rich loads from all the seas." Around him throbs the busy heart of a great city from which a ceaseless stream of traffic pulsates along great arteries throughout the length and breadth of the Peninsula.



4.—Tamil Tapping Para Rubber Tree.

# SIBERIA'S PLACE IN ASIA.

By Colonel H. G. C. Swayne, C.M.G., R.E., F.R.G.S.

(Addressed to the Society in the Geographical Hall on December 16th, 1919.)

## Part I.—Preliminary Remarks.

I will present to you to-night Siberia from a new angle, which I may call the East of Suez point of view. Here, in the North Sea, I am sorry to say there are still some of us who look on the great variety of different nations inhabiting Asia, whether North or South, as a homogeneous mass of unchangeable Orientals; their map is conveniently drawn on flat squares of Mercator's projection which stop short near Bering's Straits; Great Britain being the world's centre; and they forget that all our most cherished standards are in a fluid state to-day, and possibly interests are shifting more and more towards the shores of the Pacific, both from East and West. The countries bordering on the Pacific and furthest from the War, North and South America, China, Siberia, British India, Australia and Japan, though they have helped and suffered, are all rising in importance to-day.

From the Urals eastward round the Globe to the Rhine there is most hope of stability; and our greatest hope must be in the United States, with Japan and Siberia on the Pacific side, and France and Great Britain and Italy and Belgium on the Atlantic side. If those seven nations hold together in a world independent of Central Europe we shall retain our civilisation. The old French Revolution in Paris, and confined to France, when anarchy was temporary, is a very imperfect parallel to Bolshevism. To-day in the infected areas anarchy is more drastic and more widely spread, communications being more rapid; and it is scarcely in its nature Democratic.

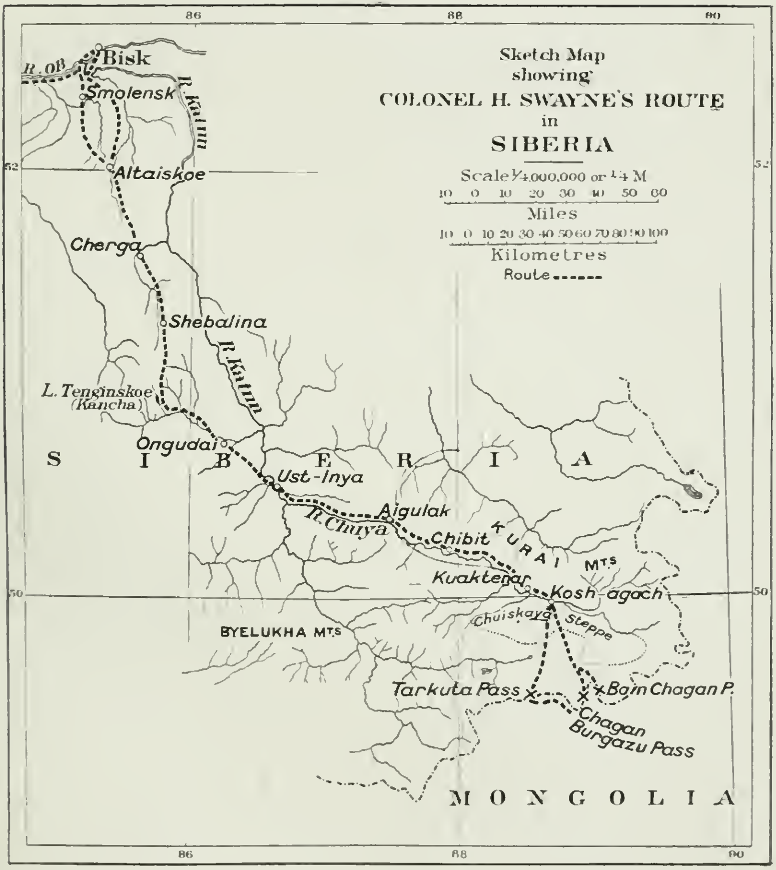
I went to Siberia first as a result of long-laid schemes matured when on exploring or sporting trips, whether as an R.E. officer under Government, or on my own account, in such countries as East Africa, Arabia, Gilgit, Tibet and Burma, extending my knowledge of Asia as a tourist in China and Japan; and in that inexpensive way I have covered, with pack animals at a foot's pace, some thirty thousand miles without the aid of steam.

So I came to Siberia with an Asiatic bias and a record of forty years out of England.

The Russian drift eastward may be said to have started about the time of our Norman Conquest, when Muscovite traders began to discover the scattered tribes of Finnish descent which thinly occupied the tracts across the Ural Mountains; and in our Elizabethan times, Yermak, the leader of Cossacks, had there established the Muscovite flag. The wave of conquest, so begun, swept across the almost empty plains of West Siberia, for three hundred years, till it had made nearly three thousand miles eastward and reached the Pacific. And this migration was essentially Russian, agricultural and pastoral. The settlers dotted the green plains in their line of advance at long intervals, with little wooden villages, each with its deep-eaved chalet-like houses, and its wooden church. We may picture the slow movement of these people with their intensely ceremonious religion, their churches with golden Byzantine bubble cupola shining in the sun, their bells, their ikons, their village popes, their men and women and children mounted clinging in clusters on their Russian farm horses; and above all, their social fraternity like the brotherhood of the Early Christians; caring little for Tsars or dynasties except in the abstract. We may picture them meeting the small tribes of Finnish, Turki, or Mongol descent, scattered thinly over this vast sector of the planet, easily absorbing these tribes into Russian christianity, or driving them off. Except in the south, in Mohammedan Turkestan, the resistance encountered could not have been great, and over the same period of time we may instructively contrast Russian expansion with our own.

Whereas the Russians advanced as agriculturists, absorbing as they went, we sent our traders in ships to centres already fully populated, where these seeds of Empire germinated, and traded and fought and protected till they became the great scattered British nations of to-day.

The railway, designed about the time of the Russo-Turkish War to link up the old scattered posts and find an ice-free port in the Pacific free from European political restrictions, was completed in the first two years of this century; and by



(By kind permission of the Royal Geographical Society.)

then Japan was already a first-class Power, the railways of the North-American Continent were being linked to the Siberian by ocean steam lines, and the world woke up to find the old Roman maps of civilisation had expanded East and West till their ends met on the Pacific, that nothing was unknown, and the planet was completely girdled by fast transport.

Nothing can happen to-day in one country without affecting every other.

So with the coming of these changes Eastern Asia, already astir began to develop with the rapidity of the details of a photographic plate in its chemical bath. Asia was no longer the dim edge of the world, and Siberia became a modern country with neighbours, who were alive and seething with change.

Now let us glance at its configuration. Let us consider the highest land of Asia at the apex of India, say the great wall of the Hindu-Koosh.

Here you have on the west the mountains of Turkestan and Afghanistan, gradually getting lower towards Persia and Mesopotamia. But on the north and east are the most generally elevated regions that exist in the world, Tibet and the Himalayan Range as far as Assam; and north-east of Tibet is Mongolia.

These countries together are the roof of Asia, where the snow lies frozen in winter, melting in spring and keeping the rivers full just when the lower levels of Middle and Southern Asia are suffering from greatest drought. By autumn the high regions are again ironbound by frost which holds up the water as in a natural reservoir. Hence we have in Asia a grand system of navigable rivers flowing on the south to the Indian Ocean and Pacific, in the north to the Arctic.

The five great Siberian rivers, the Irtish, Obi, Yenisei, Lena, and Amur, have between them a navigable length of about eleven thousand miles, or nearly enough to go half way round the world. When the railway came it cut across them, connecting them and helping them to open up new districts. In the future these glorious rivers, whose immense water-power is running to waste, may be capable of extension by systems of canals, and the great value of the mines in all the mountain ranges of the south and east may be enhanced by artificial communications.

The granary of Northern Asia is West Siberia, the plains of the Irtish and Obi; the chief towns being Tomsk, Omsk, Tobolsk; then south-east the level rises gradually to the Siberian Altai, a network of mountains which, with outlying ranges stretching into Mongolia, covers an area four times as large as Scotland. It is full of all the most valued minerals scientifically catalogued, including iron, coal and gold. Its culminating point is Bielukha, the White Range, rising to nearly twelve thousand feet, or say three Snowdons. It is a beautiful Alpine country of easy slopes like the shores of the lake of Zurich, and not so precipitous, stony, and poverty-stricken, as for instance parts of the maritime Alps of Italy; it is, indeed, covered with a continuous carpet of green pasture and smiling strips of wheat in suitable spots in the narrow valleys, and continuous forest on the slopes. In addition to that of the rich mines, the Altai sends out dairy produce like that of Switzerland, which reaches us in England. Siberian butter and wool are well known, and much of both come from the Altai.

In East Siberia there are many extensive ranges about twice the height of Snowdon, rich in all kinds of minerals, chiefly gold; there is even said to be gold in the sands of the sea near Vladivostok.

Now let us realise the rapid growth of population in Siberia and Russian Asia. There are evidences of prehistoric occupation by civilised races in the Yenisei Basin, but this great rich country has for many centuries lain almost unoccupied save for native tribes whose total number in all Siberia, before the Russians began their entry, could not have equalled the population of Manchester.

If we add the influx due to Russian penetration, we may take it that the completion of the railway about 1902 found a total white and brown and yellow population considerably less than that of Ireland. Now, I have seen it stated with some authority that by 1906 there were two millions more people in Russian Asia than in Canada, and I read in my morning paper lately that at the outbreak of war there were about twenty millions, and that if an estimate could be made to-day it would be nearer seventy mllions, owing to an exodus from European Russia caused by hard times. All these reports can be examined at leisure, but I think we have enough to show that the Siberian and Turkestan population is rapidly growing.

Now observe that according to Government statistics of the Siberian railway the registered agricultural area alone in West Siberia, together with the eight Governments of East Siberia, is altogether about four times the whole area of the British Islands, so, we may take it that when the remarkable material resources and internal geographical advantages of Siberia shall have been fully developed, the country will easily support over a hundred million people of the northern races, let us say Russians somewhat reinforced and diluted by immigrants and traders from the United States, Japan, and North China, to say nothing of Eastern Europe.

My impression is that Siberia, with its front gates on the Pacific, is destined to hold its own, in spite of the breakdown of Middle Europe.

The greatest temperate areas of the world still available for further development are to be found in Canada and Siberia in the North, and America South of the equator; and it is interesting to note that while all the Powers of Europe were struggling for small healthy plateaux in Africa, Russia quietly pegged out for her people the finest of all undeveloped areas.

Our methods for resisting rigorous climates are improving, and the world will not let those three great regions be held up from full occupation by speculators in land, and they will gradually be filled; and I believe a Siberian nation will arise in Northern and Central Asia which will reawaken that already long-civilised Continent.

## PART II.—THE ALTAI.

Harvest scenes and sights now carry me back some years to a very pleasant time in July, when travelling along a hillside track in the Altai. I came suddenly on a column of country carts and also farm horses ridden by blonde Siberian peasants, astride in twos and threes. Men, women and children were going to their work in the standing corn. The sun was up at about four in the morning, and it was already warm.

Coming as I did from a long spell of hard work in the parched famine districts of the Indian Deccan, the white man's prosperity of Southern Siberia was a revelation to me.

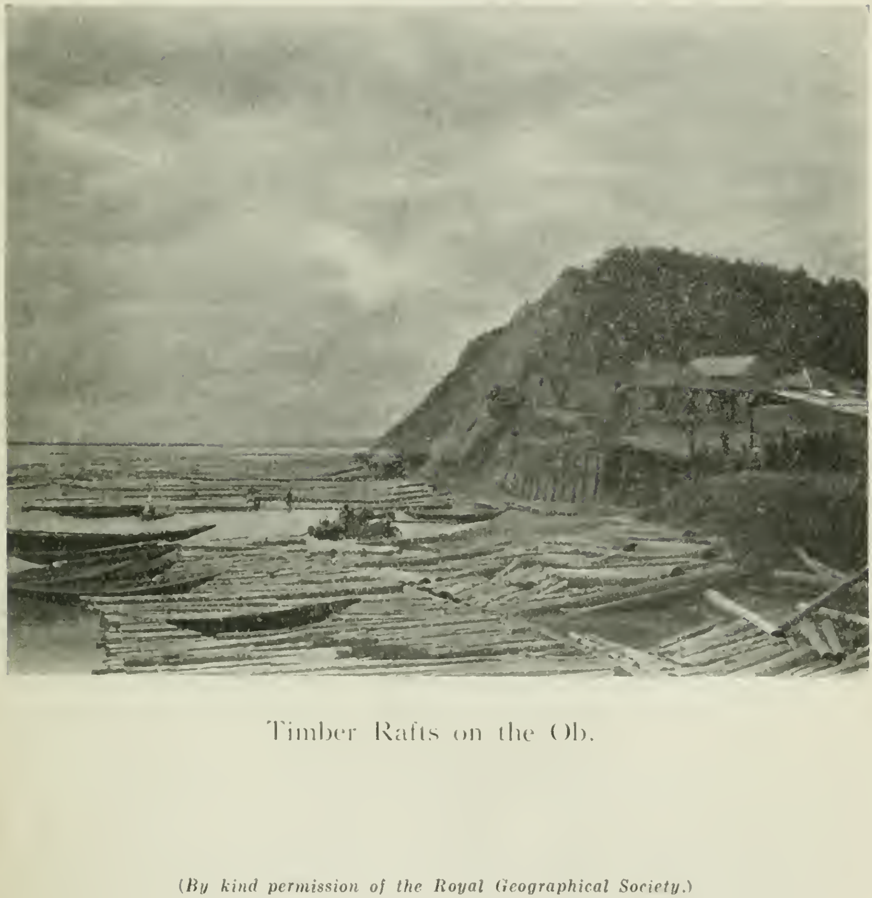
Let us take a typical home which I visited. Outside, at a sawpit at work, were the owner and his son, the house being on the edge of a small clearing in a primeval forest. 'Educated men to some extent, depending on no master and better housed by their own efforts than many farm-labourers in the Midlands are to-day. The usual hut was single-storeyed on short piles, and had two large rooms, well built, of sawn planks with dry moss or felt stuffed into crevices; the windows were double-shuttered, and a great built-in stove no doubt served to act as a sleeping platform for some members of the family in winter; plank beds were fixed along the walls, and above them, hung on pegs, the winter furs of the family, including those of the numerous children.

Warm wooded hills rose everywhere, recalling the lower hills of Kashmir or of Switzerland, and wheat grew in the valley bottoms.

Each important hamlet had a bath-house where the families bathed periodically and steamed their clothes.

After all the stories I had heard of Russian travel I had expected to be troubled with vermin at the post-houses; but I do not remember anything of the kind. Sanitary arrangements, I admit, were primitive or scarcely existed on these farms. But here is a thing which strikes one in South and West Siberia. It is better than Russia; the social standing better, with a colonial independence; and it did not in the least surprise me to hear then and now that Siberian troops had distinguished themselves.

On my journey of fifteen hundred miles spent away from the great railway, I left it at Ob Station, where the Obi River is crossed by a bridge. The distance to the last Russian post, Kosh-Agatch, on the Chinese-Mongolian border, was 750 English miles, the first 400 being covered by the regular steamer to Bisk; thence 350 miles of posting between stages by tarantass or basket carriage, drawn by a troika team, three horses, galloping over a half-finished cart-track, called the Chuisky Tract. The last half had to be ridden, with one's kit, on pack ponies. The southern part of this track led by the Katun River Gorge, hence along the banks of the rushing Chuya torrent, a gem of Altai scenery; and this was Kalmuk, or native country. But for the first seventy miles a few Russian families from the larger towns of Siberia were summering in these valleys as other people do in Switzerland. The whole region was the private property of the Tsar, administered by the Imperial Cabinet, and the representative officer who looked after it had general's rank.



Timber Rafts on the Ob.

*(By kind permission of the Royal Geographical Society.)*

Those who are bitten with land-hunger just think of this most beautiful back garden of the world, much larger than Scotland to give you private revenue, and to use as you like.

Ob Station, Novo-Nicholaevsk, the starting point for the Altai, was in a fine position for trade, astride of the Trans-Continental Railway, crossing rivers some of whose navigable waters of over 2,000 miles could perhaps for a short season communicate even with the world's oceans by the Arctic. Fortunes were being rapidly made with the advent of the line. Incomers, once needy peasants from Russia, were already prosperous by 1903, or had taken to trade or hotel-keeping. There was a thriving trade in wool and butter to Denmark and England.

On the long river journey to Bisk in the Altai one saw the peasants at close range. The upper deck contained cabins, but the well of the steamer was crowded with people just as they had come from their farms—men and women sleeping the night packed together in their day clothes, the men in long boots, and the women struggling with babies and children and bundles.

On deck at dawn you saw the powerful boat forcing itself southward up stream against the will of a swift and mighty river, which appeared to be wider than the Thames at Westminster, making its long journey to the sea, first between lonely pastures, and further north, to enter dark half-explored primeval forest tracts of immense extent, and then swampy Arctic tundra. The brown, muddy stream, flowing in a smooth sheet, shone like burnished copper; or on moonlight evenings it was a silver salver against a background of black pine forest under a pale yellow sky. The boundless prairies, rising here and there to low ridges, were dotted with herds of cattle and horses.

Four hundred miles, and back, of a river journey like this were an education in spacious life. The ship's bunkers took in wood at stopping-off places, where it was stacked in high piles, and great rafts of logs were steered down in mid-channel each by its small crew, making for the Imperial saw-mills at the Ob Station. The boat tying up at Barnaul, one called on the General Officer who represented the Cabinet, living in a fine house with a parquet-floored ball and reception room with very high doors, the walls being hung with full length oil portraits of the Tsars. Everything was on a magnificent scale even in mid-Asia, and his suite of rooms would not have been out of place in St. James's Palace. It was here you received your letters to the Altai police authorities. On the reaches towards the head of navigation at Bisk streaks of old snow appeared in the gullies, and distant snow-capped ranges emerged. We were in the richest pastures of Asia, with stock in sight everywhere grazing.

In the heart of Asia, Bisk was civilised, with many well-to-do residents, and contained two-storied hotels and some stone houses. There was a big trade in butter and also, from Mongolia, wool and hides. Yet on a rainy night it was a dreary place. Soaked wooden footpaths, unlit, threaded sheets of deep black mire, large savage dogs barked from houses and rattled their chains; while the travellers' feet felt for the slippery planks of duck-walks, laid over abysses of summer Siberian mud.

From Bisk you enter your tarantass and drive towards Mongolia, along the swift, deeply terraced Katun river. Your conveyance is a strong, springless black wicker, punt-shaped phaeton, widely slung on four low wheels and inadequately sheltered by a hood, which fails to protect you from rain and flying sheets of wet mud sent up by the heels of your three arab-like horses. There is a seat for the driver in front, two passengers behind. The shafts are joined by a hoop and bells over the centre horse, the other two galloping freely between traces, over the rough hill cart-tracks which in Russia and Siberia do duty for roads.

Your arrival at your destination is pure luck. One of my tarantasses was turned over, horses and all, one night, by a boulder as large as a piano, over which the centre horse took a flying leap, while the trace horses tried to gallop round; another tarantass was bogged for some hours at midnight; on another occasion part of a flock of tame sheep came down from a hill and jumped over my three horses.

There are dilatory pontoon ferries with stern-wheels geared on to capstans which are worked by ponies flogged round on slippery decks. Sometimes, if the ferry-man is drunk or asleep, some fifty patient Russian peasants, with their wives and children, will cheerfully camp out the night on the river shingle, cooking under the shelter of their carts.

As you reach the foothills of the Altai much flax and hemp are grown on black cotton soil like that of Southern India.

Ferry on the Katun near Ust-Inya.

*(By kind permission of the Royal Geographical Society.)*

As you continue deeper into more Alpine country the valleys are gorgeous with wild flowers, purple iris, cowslips, wild pea, orange marsh-marigold, and flowers looking like blue and white forget-me-nots in mile-long skeins; you want a botanist with you in Siberia and Mongolia, for you can ride for hours with your horses' feet brushing through wild flowers that beat for luxuriance the English meadows, the Swiss valleys, or the Kashmir "Margs" in their May and June dress.

We lodged with one trader who kept Maral stags, which in size approach the American wapiti, in a Maralnik or deer park; and he had shut a stag into an iron cage and was painfully sawing off the horns while soft. This trade over the border, to provide the Chinese with highly-prized drugs, is exterminating the Maral. I often saw the bleached antlers in some mossy swamps, but never the living wild animal.

Driving through these forests after dark we heard wolves. As you enter some of the wider flat valleys or "steppes," you pass smooth natural lawns some miles in extent overshadowed by clumps of stately cedar, the valley bottoms shelving to lakes where cattle are being driven about by Kalmuks or Kirghiz, galloping dots, and there are clusters of huts made of rough larch pit-props, shaped like North American Indian tents, or bell-shaped with upright circular walls. Richer nomads, or Russian officers on tour, have yurtas or semi-rigid tents of grey felt, with good oriental carpets.

Two high passes gave fine views of snowy ranges, and then we entered the famous gorge of the Chuya, its tributary. We were now deep in the Kalmuk country, where Russians were seldom met with, except a rare party of travelling police. In some glade you would come across Shaman horse-sacrifices, skins of ponies that had been torn asunder waving dismally in the wind from sloping poles.

Along this Chuya gorge you ride day after day, under pine-clad pinnacles of rock descending sheer for hundreds of feet, to quiet wooded slopes, with sometimes, in patches, golden grain spreading over the flats below. The cliffs contained fine ibex whose horns of about 38 inches I found half buried in an old landslide. In these gorges there are also Siberian roe-buck, but nearly impossible to find as they are much hunted or trapped by the inhabitants of the wooded Altai.

Torrent beds were choked with broken avalanche timber, and now and again the smooth grass of the valley floors were littered with great half-buried rocks as large as a cottage, where they had fallen from the cliffs or been carried down in ages past by ice or water. The scenery became grander as the gorges narrowed to southward.

I met the Ispravnik, or District Superintendent of Police, who, with a party of civil engineers, was completing the Chuisky Track. Officers travelled in tarantasses wearing neat uniforms, but the mixed crowd of Russian foremen and navvies were dressed in large black felt hats, blouses and trousers tucked into long boots; the browner Kalmuks wore loose sheepskin coats with long sleeves and Chinese riding boots of raw leather or felt like the "Gilgit boots" which sportsmen use on Kashmir passes. It was a rough-looking assembly, recalling, with its mounted men and wagons, the pilgrim fathers of the story books. We met also a Kalmuk doctor going to Mongolia to vaccinate Chinese. He carried much on his person including rifle and gun.

Altai tribesmen and their families ride past you on rapidly ambling ponies, these little people, including women, sitting astride, knee up to pony's neck, with high Tartar heels in stirrups; the men carrying strapped at their backs long guns with pronged gun-rests pointing like lances to the sky. Their cheery greeting was "Aman dai," a change from the "Salaam alaikum" of the Arabs, and "Asalam Alaik" of the Kashmiris; and their dark faces with very broad cheek bones and slanting eyes showed a mixture of Mongol and Turki blood. They were called by different names, Kaizak-Kirghiz and Kalmuks, and I think indifferently Tartars, and their religions were said to have something of Mahommedanism, Shamanism and Buddhism.

You emerge from the Chuya gorges at Kosh-agatch, the outermost Russian police post, where live a Custom's Officer and half a dozen families of Russian and native traders. They trade with Kobdo in Mongolia over the Chinese border, to which place there is a cart-track through the hills.

Between Koshagatch and a Chinese amban's post about 40 miles away over the Mongolian-Altai ridge, which is itself about 30 miles away as the crow flies, there was no permanent dwelling of any sort, merely a belt 40 miles broad of green upland, rising to about 9,000 feet, patched with old snow

On the Chuya near Kosh-Agach.

*(By kind permission of the Royal Geographical Society.)*

drifts, even in summer, and breaking into precipitous land slides and gullies here and there.

At rare intervals, once a week or so, a few Mongolian shepherds or monks may be met with, otherwise this lonely region is only roamed over by a few companies of wild rams, or parties of ibex in the precipitous rock falls; and in the Chuisaya steppe are some very wideawake Prejwalsky's gazelles, which see you and whisk off when three-quarters of a mile away.

The Chuisky track was completed by 1904, at that time bringing these remote regions, in the centre of Asia, within less than a fortnight's travelling from the great Siberian railway at the Ob. At Kosh-Agatch, wool was collected in parcels, washed, and exported to Russia by Bisk; raw hides and long camel hair, used, I was told, for the manufacture of machine belting, were also exported.

So far, I have taken you south through the wooded Siberian Altai; and we have reached the limit of all things Russian or even Russianized Tartar. As you leave Kosh-Agatch you cross a dreary bleak plain covered with shingle, the Chuisaya steppe, which is only about 5,000 feet above the sea, obviously an old lake bed, twelve miles broad and stretching right and left for 40 miles. It is shut in by snow-streaked ridges rising to 9,500 feet; it was wind-swept and cheerless, and a great contrast to the comfortable wooded country of the Siberian Altai which we had left behind us. When you have said good-bye to the priest and lost sight of the little Kosh-Agatch church-spire, you have said good-bye to even Tartar civilisation and all semblance of law, National or International.

The routine of a few week's wandering here is simple; you sleep on the ground under a shelter-tent four feet high, and your five or six Tartars crawl into another slightly larger, packing themselves for warmth as is their custom, sleeping curled up in their sheepskin or wadded coats, heads and arms tucked under their long double sleeves; your food is tinned, or anything you can fish or shoot, and it is cooked over "tesek" or horse-litter, the only fuel obtainable, which is collected from these downs in saddle-bags, and the smoke of which taints all your food.

Every few years some wandering British or Russian sportsman might visit these regions looking for a head or two of the wild rams.

Before the dawn has yellowed the East, one rides out with only the Kalmuk hunter, with field glasses and telescope, blanket, water bottle, and a tin of sardines, a few cartridges, biscuits or slab of mutton in the pockets. You trot about together on your two Mongolian ponies, gallant, hairy, strong-hearted, coarse-necked and thick-chested, built like little cart-horses, which will carry you up anything as steep as a roof, till you slip backwards on your saddle; and which, when you let the reins go, will stand for five hours in the snow without a blanket, contemplatively scratching up the ground for a bite now and then.

You spy for the great Argali rams, near cousins of Marco Polo's sheep, and you must see them when they are two or three miles away on these open treeless downs of short grass, or they will see you first. You lie for hours behind rock outcrops, sheltered from the wind, or crawl over the open patches of snowdrifts; and when it is dark your hunter gives the signal that it is useless to stay, by saying "Chai pit" (drink tea), which recalls the "Cha pina" of Indian servants. Then on foot you lead home your tired pony over hill and dale, fording streams or skating down landslides of gravel.

Sometimes, say at nine at night, on the way back to bivouac, your Kalmuk hunter will whisper "Volk" in the broken Russian and sign-language which is your only means of exchanging ideas, and he will grab at your waistcoat in a tearing way; and you will stand for a moment listening, as well as hard breathing pony and creaking saddlery will allow, to the howling of small parties of grey Siberian wolves, which are taking up the hunt after dark. One evening I saw one of these big grey wolves walk out into a plain and lie down. I took a shot at him from a very long range, but he moved away just as I fired, and disappeared mysteriously in some invisible fold of the open plain. I was more fortunate with rams. Since the dawn of their mutual creation the "Kotchkor" wild ram has been persecuted by wolves; and he is, accordingly, about the most alert and long-sighted thing on four legs. He has developed a very proper independence; and the inroads of the rare British traveller in search of something difficult to shoot, who burns a dozen cartridges a month and goes home again over two continents, make no impression on the number of these animals. As an instance, I have seen eighty rams together, all big males, as large as a donkey, with horns as wide as an armchair, but I never got within a mile of them. We had already hidden our ponies in a fold of the ground, and had crawled up to cover; the telescope only revealed, a mile away, a moving row of great heads on the sky-line, each ram stopping as he passed by, and turning his head at right angles to look at us. Five minutes later, in an open phalanx, they were galloping at full speed along a distant saddle in the hills. 'And they can gallop! One evening at dusk I heard heavy bleating, and discovered 500 ewes and big lambs half filling a small valley.

By day the rams are almost invulnerable; but by night they fall an easy prey to wolves, as is evidenced by the great skulls and skeletons lying about in little groups where they have attempted to defend themselves, generally below the caves of the wolves' families, they having probably been rounded up and driven and killed there for convenience. Skulls of many months' or even years' date are found half-buried in the shingle and driftwood of torrent beds.

On the borders of streams you can gather abundance of wild rhubarb, sweet and palatable. It greatly helps out one's fare.

The easy passes through the Mongolian divide are snow-bound by autumn. In summer, when you traverse them in search of wild sheep, you carry your Chinese passport engrossed by Downing Street in black and red; but you will meet no one, and you look southward into China over hundreds of miles of the same rolling ground apparently devoid of trees; and the higher pale-green prairie is streaked with snow. An occasional point of it, such, for instance, as a Matterhorn-like peak called by the natives Muss-Ta, some thirty miles to the south, rises to eternal snow at about 11,000 feet, looking remote and very beautiful in the bright, cool sunlight.

It is said the Nomadic tribes here owe no allegiance to anyone but cross the frontier at will. The nearest Chinese post is Suok-Karaul, under an Amban, who moves about on tour, returning a polite message in exchange for your visiting-card.

Outcrops of rocks through the short grass are flecked with mosses and lichens in hot burnt sienna, bright rusty red, pale green and lemon yellow. White snow partridges were seen running about with their chicks; and marmots scuttle into their burrows as you pass.

Mosquitoes are terrible where melting snow gives place to crocuses, or on the borders of tarns where reindeer-moss grows in swamps say at 9,000 feet. They bite in the afternoon, the cold driving them in at night. Indian ones bite in the early dawn, driven in by the heat of the day.

There is here the freedom and fascination common to all high Alps, veldt, prairie or desert. The weather changes hourly, and within a few summer weeks you will get rain showers, hail, thunder, and even flurries of snow; you may look over a bank of flowers in July in bright sunshine, to fresh snow sprinkled over slopes, showing white against an inky cloud. On one of these days, after a week during which a hundred miles had been covered riding about looking for game, without a solitary human being having been sighted, we saw the first natives on the Chinese side, a long line of dark-cloaked figures on horseback defiling from a sandy river-bed in a distant fold of the hills; as a precaution my Kalmuk gillie and I kept quiet as we lay spying behind our rock; but next morning after our return to the safer companionship of our bivouac, we found a large camp with herds of long-haired black and piebald yaks, sheep, and horses, being moved about by mounted Kalmuks; it was evidently a round-up of stock. Many savage dogs protected the tents.

The purchase of a sheep opened relations, and mongols rode over and conducted me to the camp; and I found them to be smiling fellows in red cloth caps, with red saddle cloths, half shepherd, half monk. They offered me snuff from a jar with a long-handled spoon, and grey mare's milk cheese, probably of the same kind as that which they must have offered to Marco Polo a few centuries ago. A people of whom I believe he expressed a high opinion for their honesty and goodness.

Our own camp was always a mere bivouac. Yembai, the cook, had a curious and useful talent, as he could tire out fish, a kind of grayling I think, by running after them along the shallows of the mountain streams; then when they sulked in the weedy pools he would throw himself flat, plunge in his arm, and bring up the fish.

### PART III.—THE SIBERIAN RAILWAY.

Having seen something of the two Altais, let us recall scenes on the Siberian railway, which I revisited in June, 1914, with my wife and daughter on the way home from Japan.

From Dalny (Port Arthur) we went by the Japanese controlled Manchurian Railway to join the Siberian at Kharbin. At Chang-chun you left the Japanese train, escorts, permanent-way sentries, and railway staff behind, and by walking across to another platform we entered a Russian train with escorts, sentries and passengers, all Russian. Broken Russian and German were the only languages of any use. German commercials were much in evidence.

As you steam into the first Siberian towns, coming from the orderly life of Japan, the sudden change to makeshift colonial mining conditions was striking; rough cart-tracks instead of roads; muddy carriages and carts, troika harness repaired with rope; and roughly dressed uncouth prairie men and miners of many races; you began to hear stories of robbery and violence; two bank officials carrying money in their car had been killed by a gang armed with automatic pistols in the streets of a large town.

It seems a queer thing to say, but after civilised Japan a stranger, accustomed also to the really gentler, more civilised races of India and parts of Central Africa, found East Siberia an insecure extension of a rough, cosmopolitan Europe.

As one went north-west along the railway one had the Mongolian frontier west and south-west. In the train, the dawn, followed by sunshine before three o'clock, disclosed a fine treeless prairie country, green to the horizon, with vast herds of ponies and cattle dotted about at long intervals. Small lakes of rain-water lay here and there; at a stopping-off platform we saw a few big Manchurians in sheepskins looking like ancient Goths. We went on thus for 36 hours; on the third morning the prairie had crumpled up into rolling hills patched with forest, and at sunset we were skirting Lake Baikal. Steaming through the night round its shores, soon after dawn our train reached the city of Irkutsk, the Siberian Capital, with its churches, opera house, and modern shops. Leaving this place and steaming all day, one enters in the evening a southern portion of the kind of primeval forest country called "Taiga," which fills some millions of square miles of unoccupied Northern Asia; and one passes through it all next day, reaching Krasnoyarsk only to pass into forest again, chiefly pine, larch and birch.

At the halts, at railway stations, jostling with prairie men, white children, Kalmuks, Manchurians, Mongolians, Kirghiz, Turkis, were well-dressed Moscow people and Russian police and military officers. Small Kirghiz ladies, a laughing group posing before a camera, wore native dress and had gay European parasols. All promenade and bargain at peasants' stalls for food spread out under the station sheds; they keep their knives and forks and plates, and carry the food to their compartment. There are cooked turkeys, poultry, pork, eggs, and bread in abundance, milk three halfpence a quart with the bottle, cream, butter, jam, fish, and all farm produce; and there is a Samovar always on tap for making tea. I never got cheaper or better food than when travelling by these ordinary Russian trains in Siberia.

Stacked in the goods-sheds one saw, in passing, the products for export; wheat, butter, wool, hides, hemp; and among imports were reapers and binders and other agricultural implements and machinery in some quantities.

West Siberia, long-settled, was quieter and more civilised than East Siberia; depending more on agriculture than on mining; and coming from the crowds of India, the calm of West Siberia appealed to me. It was homely as a southern English county.

Here, if anywhere, should be great mechanical tractors on the land. The long wheat furrows stretched like an unbroken sea from the railway to the horizon, some dark bluffs of pine breaking the monotony now and then.

As you cross the Urals the climate in summer is like that of England. The rising sun found us still going westward between finely-wooded rounded hills about the height of Snowdon above the sea. Fishermen's hamlets stood on the margins of small lakes among Norway pine and cedar.

After a halt at Ufa, 200 miles west of these hills, one passes wide golden prairie or pasture, with droves of horses being rounded up by cowboys; small villages, surrounded by stockyards, stood like islands in the dips of the plains, with the inevitable church spire of green and red and gold. Light wreaths of sweeping colour, yellow, deep rose, or violet, spoke of distant masses of wild flowers.

One carries this landscape of West Siberia on through

The Vaccinator of Koaktenar.

(*By kind permission of the Royal Geographical Society.*)

European Russia; but socially the people appear poorer, worse educated, worse dressed and more down-trodden than in West and Mid-Siberia.

At noon on the fourteenth day from Port Arthur, having come by local ordinary trains, we steamed into Moscow.

## PART IV.—CONCLUDING REMARKS.

After living in England, where nearly every foot of land belongs to someone and life is a matter of fitting one's self into conventional surroundings, these spaces of Siberia set one dreaming of the progress of a new race, with its back to Europe and looking eastward, unhampered by the débris of dying prejudices.

For such a future Siberia has already many initial advantages. Its main natural communications, as distinguished from artificial ones, are already there in its great rivers, and probable possibilities of extension by canals, and they run through country which will some day support prosperous colonies. I would judge there are great possibilities also for electrically using the vast stores of water power running to waste in summer. In the mountain districts where mines are there are torrents which favour electric railways.

Goods and raw materials have access for interchange from north, east and west, and when railways shall have been developed towards Persia, there will be an outlet from Siberia and the Russian colonies of Turkestan to India, that glorious member of our Commonwealth, that great world's reservoir of crowded humanity, much quick intelligence and labour, which will always be comparatively cheap.

Labour is cheap in India, this civilised and developed part of the Asiatic tropics, because a poor man can keep a family and give it the little clothing, food, and shelter demanded by this climate, at a much smaller cost than can the man living in a rigorous northern climate where much comfort and recreation is required, and high wages have to be asked.

India, from an almost purely agricultural country, is rapidly becoming more industrial. Indians are already, as we know, working cotton-mills, rolled steel joists, sugar and flour refineries, jam factories, harness and saddlery factories, carriage factories, oriental carpet factories, and engine drivers understanding steam plant can be hired at most large centres for about £5 or £6 a month. In the management of motor cars, of which there is an immense import, Indians are showing considerable aptitude. It is only 14 years ago that India took up the "Swadeshi" movement—a movement, I believe, started to encourage home manufacture in the country itself.

I happen to have had a couple of years' experience of genuine British skilled labour in Flanders, and for over thirty years have personally dealt with Indian labour, on military and public works; and I believe that when mechanical knowledge and technical education shall have become universal the Southern Asiatic, with his agile brains, will in certain industries meet the European on fairly equal terms; not that he can do so individually, but there are so many of him and he wants so little. So, much as I may dislike it, as a genuine admirer of British labour, I think manufacturing industries may have a tendency to gravitate slowly towards the more crowded Southern countries, where brains and labour of a kind are cheap and plentiful. I know nothing about cotton, but there does seem a future in working up Indian raw materials with Indian labour for an Indian market. The Briton is not perhaps so frugal, nor patient, nor easily disciplined, nor perhaps even so quick-witted as the Oriental, but he is fitted above all competition for anything requiring individual grit and pluck and directness and eminently as a supervisor; he will also be unrivalled for fighting the rigorous northern climates, or for working in the south, either as a superintendent of labour or as a civil administrator; he will therefore command a good price for his talents—for which I believe there will always be a demand in tropical countries.

But in order fully to utilise the rigorous northern parts of Asia it may be necessary to throw overboard all conceptions of life as lived by Western Europeans in the past, and the root idea of migratory labour seems applicable either for mines or cultivation. The range of wheat, that most adaptable cereal, stretches from the Central Provinces of India to near the Arctic Circle, where the summer day gives 18 hours of sunshine.

It would be difficult, in the absence of special facilities and plenty of capital, to live, bring up children, build comfortable houses, supply food, and carry on all the complications of educated civilisation with a winter average temperature below zero. But later on with quick railways and tramways and all kinds of easy transit and haulage, agricultural machines and the plentiful stock of fuel, modern power stations, well-designed tramway towns, and road-towns, not to speak of the aeroplane parcel-post, there seems no reason why suitable places far north should be left unmined or uncultivated because of the cold season, which all could escape from when at its worst.

With transit improvements it is increasingly evident that we are doing more as the birds and nomadic tribes have always done; instead of expecting our means of livelihood to come to us, we are gaining it more in migratory ways. This is shown by the migration of Italian workmen to and fro across the Atlantic; Italians and Roumanians coming to the Rhône for the vintage; Madrassee and other labour between India and parts of Africa and Burma; and lately when coal and iron has been found on islands of the Arctic it looks as if migratory labour might be used with advantage.

Given the possibility in the future of doing most work by machines, even farm work, it does not require much imagination to foresee those lands being developed by powerful capitalist companies capable of transporting highly specialised white labour to and fro, having summer farms and mines in the north and superintending winter factories in the south and temperate climates. It would not matter if the many or the few owned the capital. As I see it the north would then be developed by extremely well-paid, picked, hardy, capable labour, and races producing cheaper labour could stay in the easier warmer south and have the food sent south to them in exchange for certain kinds of manufactures. Already I have seen the charitable in America sending assistance in the shape of shiploads of wheat to stave off famine in the Deccan of South India.

If there arises out of present trouble an independent Democratic Siberia it may mean a quickening in Asia. States will expand their railways, and deal with one another all over Asia. The natural direction of exchange of commodities is, I believe, between north and south; as railways extend in S.W. Asia products of temperate and tropical climates would be gradually exchanged by local steps—competing, in suitable products, with the roundabout sea voyage from the Baltic to the Indian Ocean.

Wood is generally water-borne—but I have seen wood in sides of tea-boxes shipped at Reval on the Baltic for Ceylon, eventually to go back to Europe full of tea. I have constructed buildings in India, using light American pine-plank ceilings, which seem to have come a long way, and yet there are probably suitable forests in Central Asia producing such wood and rivers to bring them down. I speak naturally with diffidence here in the headquarters of cotton; and I am told the suitable climate and hereditary skill of Manchester are most important in this industry, but in India, whatever the quality, it grows close to cheap labour having a sure market close by; yet it seems queer one can buy painted Indian cottons in Agra bazaar marked with a Manchester trade-mark, probably made of cotton grown in America, and these fabrics reappear in London as Indian curtains. Again, Europeans in India eat refined white sugar grown in French beet-fields or West Indian cane plantations when there is sugar-cane growing round nearly every village in parts of Bengal, and on feast days every child's chief recreation is to go along with a native "golliwog" under its arm and sucking a piece of sugar cane as long as itself.

Though I have had to do with labour of many Eastern races, I must speak with great caution of commerce; but, what I want to suggest is that when knowledge and machines have spread evenly in all countries, raw materials will not travel so far, and trade will be more between north and south, and this will help the development of Asia. The reason, I believe, of the great value of the tropical trade through Nijni Novgorod or Venice to Europe was that India and China were the only densely populated civilised southern countries producing tropical products—it was really a trade between north and south. Africa was very little developed in those days.

As Siberia develops we shall see future railway systems of Siberia connected with the other vast railway systems for which China is obviously waiting; for the mountain barriers between the two countries are not difficult obstacles.

Anyone who knows the engineering gymnastics of the Italian Alps, where railways corkscrew upwards entirely inside the mountains for great distances, knows that even the Himalayas between India and Central Asia will be no insurmountable obstacle in the future; it will only be a matter of whether piercing and surmounting them would pay.

Taking it all round, Asia and the Pacific, and especially

Siberia, are likely to have an increasing influence in the future. I am not suggesting we should emigrate there, for we have places under our own flag; but we have a very great trade in China which will increase, and it is by that road we shall probably send our travellers on to the Great Siberia of the future and secure for our workshops orders for the tractors, mining implements, electrical power plant, and railway bridges which the Siberian will want.

## Review.

"The Geography of France." By Raoul Blanchard, Professor of Geography, University of Grenoble; and Millicent Todd, Lecturer in Geography to A.T.F. School Detachment, University of Grenoble. Rand, McNally and Co., New York, 1919.

This interesting summary of the contour of the whole of France and parts of Italy, Switzerland and Spain, so far as it would be difficult to exclude them in such a descriptive geographical record, is a distinct advance in the efforts of recent years to justify the science of geography taking a high position amongst the other sciences included in the curriculum of every university.

Starting from the causes which define roughly the structure of the country, that is the great upheaval of past ages, these authors proceed to explain the reasons why regional districts should be specially suitable for producing wine, cattle, wheat, etc.; where coal, minerals and granite are deposited, and why the climate is dry over considerable areas, and why it is damp in others, and no student of geography can fail to extend his conscious evolution of grasping the formation and character of wide and extensive areas of country which enables him to form accurate conclusions when faced with commercial or political problems affecting countries wherein his interests are cast.

The final chapter in this book refers to the French Colonial Empire, second in extent and importance only to that of Great Britain. In regard to the structure of Western France, the mountains of the Alps have had great predominating effect, and as Byron mentions in

"Mont Blanc is the monarch of mountains,
They crowned him long ago
With a throne of rocks and a robe of clouds,
And a diadem of snow."

C. A. C.

# THE INTERNATIONAL RIVERS OF EUROPE.

By Professor L. W. Lyde, M.A.

(The Presidential Address delivered to the Geographical Section (E) at the Bournemouth (1919) Meeting of the British Association for the Advancement of Science.)

This subject was chosen before the publication of the Treaty of Peace, and was dictated by a wish to combine my geographical creed with the political conditions of an 'Americanised' Europe. The Treaty embodies so many of the principles which I wished to emphasise, that my treatment should perhaps now be rather historical than political.

My geographical faith is in Outlook; the jargon of to-day is about Leagues of Nations. This is the day of nations and nationalities, and geographers must rejoice in the fact, because civilisation depends on a blend of varied influences—each an individual element, a *genius loci*—and the triumph of nationality must curb that tendency to a drab cosmopolitanism which would crush out all such variety. But these varied influences cannot blend into a progressive civilisation unless they have all possible facilities for friendly meeting; for instance, International Rivers should not be, like International Finance, anti-national, but really inter-national, "between nations," common to all nations, and encouraging the friendly meeting of diverse political elements and ideas. Liberty always makes for differentiation—in nations as in individuals; and if our international intercourse becomes really "free" the desired variety is guaranteed.

This is why I would like to press the truth that Outlook is, or ought to be, the motto of geography. It is so for many of us, and it ought to be for all. But the word covers both a process and an objective. The Outlook is essentially over Big Mother Earth; the process is visualisation—the picturing of forms and forces, places and peoples, beyond the horizon, all possible horizons being included in the one great unit of the globe. But the geographical inter-action of the Man and the Place cannot be dissociated—least of all in Political Geography—from the historical interdependence of group and group. Both alike are concerned with progress. We want to know, therefore, the whole simple truth—what the particular features and phenomena mean as world features and world phenomena, *not* what special meaning can be read into them, or extracted from them, by some local and interested political unit. Geography is, first of all, the visualisation of the world and the relations of the various parts of the world.

Now, the one predominant feature of the earth's surface is not land, but water. Nearly all international problems of to-day have to do, explicitly or implicitly, with the ocean, *i.e.*, with access to cheap water transport on the medium which covers three-quarters of the whole surface of the earth. Even the problem of Alsace-Lorraine, itself perhaps purely a land problem, conceals—especially from the Swiss point of view—a problem of access to the sea; and the problems of Poland, of Italy, of Jugoslavia, are obviously sea-problems or sea-problems very slightly disguised.

It is a truism that the ocean attracts rivers and their trade and their riverine population. Industry, commerce, even culture, have been starved and stunted in various parts of the world by lack of easy access to the sea. Even your League of Nations idea has more than once approximated to a substantial fact—round the Mediterranean and round the Baltic, facilitated by inter-national or inter-racial rivers. The Hanseatic League was essentially based on the relation of a number of more or less navigable rivers to an inland sea, and that was why it came to include such distant "inland" members as Breslau and Cracow.

Accessibility is now more than ever before a supreme factor in all cultural and economic development, and rivers are still the chief natural intermediaries between land and sea. The first real international attempt to solve the problem of international rivers followed the victory of Sea Power over the France of Napoleon the Great; the second has followed the victory of Sea Power over this would-be "Napoleon" of Prussia.

Now, I submit that to many of us the mere word *river* by itself suggests, at once and primarily, a physical unity—no doubt, with some variety of relief and climate—and that on this physical unity we are prepared to sanction some social and economic and even political unity. But directly you add the qualifying *international* the suggestion changes; the adjective raises a picture not of local features, but of regional relations.

In recent years I have pleaded for the use of rivers as political boundaries—on the ground that they clearly separate lands without at all separating peoples except in time of war; we want to preserve the valuable variety of political and cultured units, but to draw the various units together. Our object is unity, not uniformity. The proposal has been objected to—even by some who are not at heart hostile to the idea of fostering all possible aids to the easy, honourable, friendly intercourse of peoples—on the ground that rivers shift their courses. They do, and trouble has come of this in the past, political trouble as well as economic. The Missouri was a fertile source of Inter-State squabbles. But no normal person would *choose* a mud-carrier, like the Missouri, "Muddy Water," or the Blue Nile, " Muddy Nile," or the Hwangho, " Yellow (mud) River," as a political boundary, unless there was a marked difference of racial type or nationality running approximately along the line of the river. In fact, I would suggest that the troubles along the Missouri were really due to the fact that the river was *nowhere* an Inter-State boundary, and therefore each State claimed the right to monopolise it in the particular section. If it had been an Inter-State boundary from the first, such a claim would have been obviously absurd. And it was the inquity of the claim to monopoly that forced the United States, as similar conditions forced the Australian Commonwealth, to take over the control of the Inter-State rivers.

The principles behind the control are significant. Thus, the Murrumbidgee is entirely within New South Wales, as the Goulburn is entirely within Victoria; but the Murray is an Inter-State river—in a double sense, acting as the boundary between New South Wales and Victoria, and emptying through South Australia. New South Wales has entire use of the Murrumbidgee, and Victoria of the Goulburn, but the whole volume of the Murray up to normal low-water level is left to South Australia. In Europe navigation is usually far more important than irrigation. Why should not Europe exercise similar control over the navigable rivers of Europe?

For, geographically, great navigable rivers are essentially a continental feature, *i.e.*, really a world feature, for all major continental features must be included in a survey of world features, even if they are minor world features; and the world can recognise no right of a political unit to regional monopoly of the commercial advantages of such a feature to the disadvantage of other political units—least of all, others in the same region. As with the irrigation when a river is obviously and entirely within an area where identity of culture and sentiment proclaims a natural or national unit, then that unit has a claim—even if it should prove impolitic to press it—to some monopoly of the facilities afforded by that river. But when the river runs through or between two or more such natural or national units, *i.e.*, is really international, one of the units has no claim to any monopoly against the other or others.

It was reasonable that expanding Prussia should get to the mouth of the Elbe, and it was certain that Holstein had been both a fief of the Holy Roman Empire and in the German Confederation of 1815, and that succession in Holstein could *not* go in the female line. It was equally certain that Schleswig had never been in either the Holy Roman Empire or the German Confederation, and that succession in Schleswig *could* go in the female line. The reasonable sequel in 1864 would have been for Prussia to purchase Holstein from Denmark, and share the facilities of the international river.

One would not expect such a view to be taken by a Prussian, but that was the actual principle laid down by France nearly one hundred years earlier. The famous Decree of November 16, 1792, asserted that "No nation can, without injustice, claim the right to occupy exclusively a river-channel, and to prevent the riparian States from enjoying the same advantages. Such an attitude is a relic of feudal slavery, or at any rate an odious monopoly imposed by force." This was not mere talk. It was followed, in 1793, by the complete freeing of the Scheldt and the Meuse to all riparians—France herself being a riparian in each case, for the Scheldt was naturally navigable up to Valenciennes. Somewhat similar rights were extended, in 1795, to all riparians on the Rhine—France herself, of course, being again a riparian; and in 1797 the freedom was extended, so far as France was concerned, to the ships of foreign nations, though Holland was able to make the privilege valueless.

The original Decree had not pressed the precise question of internationality. But, if the general principle holds—that a great navigable river cannot be monopolised by a single political unit against riparians, even if they are its subjects and of alien " race "—still more must it hold when the river in question is fully international, flowing through or between two or more States. Of course, Rhine, Danube, and Vistula do both.

As a matter of fact, in Europe this principle has been generally accepted for the last century except by Holland. Prussia and Saxony agreed about the Elbe in 1815, and the agreement was extended to Austria, Hanover and Denmark in 1821. Prussia, Hanover and Bremen made a similar agreement about the Weser in 1823; and Spain and Portugal made similar agreements about the Tagus and the Douro in 1829 and 1835. Holland, however, has a very tarnished record, behind which there lurks some responsibility for all the blood shed along the middle course of the Rhine.

One has not an atom of sympathy with the arrogant German demand that " small nations must not be allowed to interfere with the development of great nations, least of all with that of the greatest of nations," and that Holland—simply on the ground of her small size—should be robbed of her three estuaries in the interest of Germany. But neither has one an atom of sympathy with the Dutch habit of taking advantage of that small size to behave in a mean and unreasonable way on the assumption that no Power except Germany would use force against such a little people. I would like to illustrate the position by an analysis of the problem on a canal, for one must include straits and canals with rivers. Their inclusion may involve some difficulty, but in the most serious case the difficulty is already largely solved. I refer to the Panama Canal during the second year of the war, when British shipping was exactly half as large again as U.S.A. shipping, amounting to very nearly 42 per cent. of the whole traffic. The total result of the war, however, has been a loss of over 5,200,000 tons of British shipping, involving a reduction of 13.5 pe rcent. in our carrying power at sea, while the U.S.A. tonnage has increased by nearly 6,730,000 tone, *i.e.*, an increase of 382.1 per cent. in the U.S.A. sea-going tonnage (June, 1919).

The case which I propose to analyse is that of the Terneuzen Canal, and I wish to press it with all possible emphasis for three reasons: (1) it shows a typical case of quite natural—

and, therefore, almost pardonable—human selfishness; (2) its supporters are guilty of an extraordinary blindness to their own mercantile *advantage*; (3) it repeats exactly what has occurred on the Meuse-Maas, only in such an artificial way as to make it very obvious.

Ghent is the second port in Belgium, and the first industrial town in Flanders. In the days before the separation of the two countries it was connected with Terneuzen, *i.e.*, "open-sea" navigation on the Scheldt, by a canal twenty miles long, of which rather more than half was in "Belgian" and rather less than half in "Dutch" territory, the actual sea-connexion being—unfortunately—in the Dutch territory.

At the time of the Franco-Prussian War the Belgians decided to enlarge the canal, but had to *waste eight years* in obtaining the consent of the Dutch to the undertaking. Even then the consent was given only on the condition that the Belgians should pay for all work done by the Dutch, give an annual grant of some £13,000 for the upkeep of the new works, and grant Terneuzen preferential rates on Belgian railways! Some twenty-five years later it became necessary again to enlarge the canal; this was begun in 1895 on condition that Belgium again paid all the cost, that the Dutch had the right to close the locks "whenever they deemed it useful to safeguard Dutch interests," and that various other concessions were granted, *e.g.*, about the Antwerp-Rosendaal railway; and the complete agreement was signed in 1902. The total cost was £1,600,000, a large proportion being spent *on the port of Terneuzen*; but the control is entirely in the hands of the Dutch, with the result that the Belgian part of the canal is both broader and deeper than the Dutch part, so that the larger Belgian boats even now cannot reach Terneuzen! That is to say, after all the cost, the concessions, the delay, etc., the trade of Ghent is still half-strangled, and may be cut off at any moment. Of course, the stupidity of the Dutch in thus crippling their own trade is unpardonable; but what about Belgium? Even then her boats have only reached the Scheldt—a river of little use to Holland, but vital to Belgium; and the Dutch pilot dues are 300 per cent. higher on the Scheldt than on the Rhine.

It has been typical, too, that, when the Dutch have granted any facilities, it has been done by special treaty, *i.e.*, done as a matter of policy, not of justice. It was from this point of view that they agreed to the Lek and the Waal being recognised as the proper mouths of the Rhine. This emphasis on policy rather than on justice has not, however, been confined to Holland, though she alone still adheres to it. In Europe, in America, in Africa, and even in Asia, there have been, first, attempts to enforce a so-called political right of sovereignty against neighbours, *e.g.*, on the Mississippi by Spain, on the St. Lawrence by us, on the Amazon by Brazil, on the Zambesi by Portugal, and then special conventions somewhat on the lines of a Treaty of Commerce. Such treaties grant commercial facilities, and power of navigation is such a facility; but if the navigation is on a great continental feature, such as an international river, surely the particular facility should be admitted *without* any special treaty.

This claim has been specifically put forward on several occasions. For instance, by the Treaty of Paris (1763) we had the privilege granted to us of "navigation on the Mississippi to the sea," and "*to* the sea" meant "*out into* the sea." When the river passed under the control of the United States, the conditions were altered. Spain had granted no such facility to them, and she claimed the *political* right to block the estuary against them, while Jefferson claimed that they had a *natural* right to use the whole river, *i.e.*, had such a "right in equity, in reason, in humanity." The same question arose on the St. Lawrence, where we claimed the political right to block the lower river against the United States in 1824. The case is specially important because Adams at once admitted the *political* right, *i.e.*, the riparian "sovereignty," but claimed—as Jefferson had done—a *natural* right to use the river itself, a right which he based on necessity and on the support of the political Powers of Europe as formulated in many conventions and agreements and commercial treaties.

There had been so many of these that it had become possible to generalise as to a common principle—really the principle of justice; and so the Treaty of Paris in 1814 and the Congress of Vienna had adopted the principle, and had passed general rules in sympathy with it, rules which have been applied to many rivers and even canals—*e.g.*, in the old Kingdom of Poland. In the particular case of the St. Lawrence, the water right would not cover any right of portage; but, of course, the international boundary comes to this river from New York State below the last of the rapids.

In 1851 Brazil claimed the political right to block the mouth of the Amazon, but this was universally condemned as a gross misuse of the right of riparian sovereignty, for the mouth of the Amazon is even more truly than the Dollart an arm of the sea—so truly that it separates two distinct faunas; and, as the Plate was declared free in 1852, Brazil could not in decency exercise her dubious " right." It was not formally given up, however, till 1867; and it lies implicitly behind the recent so-called " concessions " to Bolivia.

Portuguese law raised a similar difficulty in 1883 on the Zambesi. Of course, Portugal was our oldest ally, and our relations were very friendly; but, though she neither controlled nor traded with the interior, she claimed the political right to block the estuary against us, and we admitted the *political* right so far as to consent to her imposing duties—which, in theory, might have been prohibitive of all trade.

The Zambesi is specially interesting because it was concerned with one of the first of those land-corridors about which there has been so much discussion lately—the "Caprivi finger." Everyone except our lawyer politicians knew the real object, the certain meaning and the probable result, of our conceding that strip to Germany—though most of us pictured German troops marching eastward along it to cut the " Cape-to-Cairo " route in Rhodesia, rather than Rhodesians riding westward into Ovamboland. But theoretically the Germans made a demand for access to navigable water on an international river, and we recognised this as a reasonable demand, and granted it. Here, again, we stand historically in a position of great moral strength. Further, if we accept international land-corridors and international air-corridors, we must accept also international water-corridors, such as a navigable river or a narrow strait.

I do not want, however, to press an African example, partly because I do want to repudiate entirely the application of the Berlin Conference to any rivers outside Africa. For in 1884 Africa was essentially a virgin continent, and its inhabitants were completely ignored—in theory by all the deliberators, and in practice also by the nation which had engineered the Conference. For one of Germany's essential objects was to converge on the Congo, and squeeze out Belgian interests; and eventually, to do that, she did not hesitate to employ the most unscrupulous propagandists in this country on "Congo atrocities." It was, therefore, part of her scheme to press—what was accepted by the Conference—that the Congo should be open to all flags for all commercial purposes, and that *no riparian rights* should be recognised. It was equally to her interest that the International Committee of Administration agreed upon should never be set up, and it never has been; and, of course, in 1911 she used the trouble which she had provoked in Morocco, to acquire 100,000 square miles of the French Congo, so that she became a territorial Power in the West as well as in the East.

The whole question has two aspects—(1) the freedom of the actual navigation, and (2) the administration of the river. The former is largely a matter of equity, and so did not appeal to the Dutch or Portuguese lawyers; the latter is largely a matter of law, and has been much complicated by legal subtleties. But the two are closely connected, for the European rivers with which we are specially concerned, all have a lower course over the plain and an upper course involved in the folds and blocks of Central Europe. They are, therefore, important in the one case merely as carriers by water, and—all things considered, and in spite of superstitions to the contrary—are probably dearer as well as less flexible than the carriers by rail that cross them from west to east; thus the quantity of foodstuffs that reached Berlin—or New Orleans—by water in 1913 was quite insignificant. In the other case, however, they are of supreme importance, for their valleys focus the whole commercial movement, *e.g.*, of Switzerland, both by rail and by water. This puts the people of the upper river-basin commercially at the mercy of the holders of the lower; at least a third of the Swiss imports before the war were from Germany, and a fifth of the exports went to Germany—much, in each case, done under what the Swiss felt as "compulsion."

In this particular case the people of the Rhine delta were also—politically—at the mercy of the Germans. For the natural outlets of the Rhine basin, such as Rotterdam and Antwerp, had taken on naturally the international character of all great ports, while the river-towns behind them, such as Cologne and Frankfort, were nurseries of intense national feeling, most carefully and criminally fostered by the Government with the declared object of presently imposing that "nationality" upon the "internationalised" port. One way of entirely undermining a position offering such opportunities to the unscrupulous is international control, with its impartial improvement of the waterway *on its own merits*. Thus, in 1913 nothing like 1 per cent. of the navigation on the Rhine was British, while over 65 per cent. was Dutch; but the deepening of the Rhine up to Basel to admit sea-going vessels, *e.g.*, from London or Newcastle, would instantly free the Swiss from their slavish dependence on *e.g.* Westphalian coal.

It is the political aspect, however, rather than the economic that I want to press for the moment. The economic aspect is useful only because it can be presented more easily in a statistical form, while the historic—though equally, if not more, illuminating—cannot be applied to recent events. We can see now that Peter the Great did not provide "a gate by which (his) people could get out to the Baltic," only one by which foreigners got into Russia; but we cannot have similar knowledge of the political value to Bohemia of the economically invaluable Elbe-Moldan. We can note, however, that it is essentially a way *out*, for the quantity of down-stream traffic (*e.g.*, lignite, sugar, grain) is five times that of the up-stream traffic (*e.g.*, iron, cotton, oils).

The agreements already mentioned, with regard to Elbe and Weser, Tagus and Douro, show that freedom of navigation has been granted as a reasonable courtesy for many years by nearly all civilised Powers, though even to this day Holland has persistently blocked progress by her stupid commercial policy and her unique position at the mouths of Rhine and Maas and Scheldt; and the essential principles are illustrated by the irrigation laws of Australia and the United States, where everyone now admits that the individual State cannot have any local standing, any riparian claims, as against the Commonwealth. All States, whatever their size or wealth or population, must be equal, though the natural advantages are with the upper riparians for irrigation as with the lower riparians for navigation.

The serious administrative difficulties are two—concerned respectively with the riparian sovereignty and with the different geographical conditions of different rivers or different parts of the same river; *e.g.*, you can easily decrease the pace of the Rhine above Mannheim, but not without increasing the susceptibility to frost.

Historically, Riparian Sovereignty, in the case of Rhine and Danube, is only a relic of Feudal robbery. When they first became part of the civilised world under Rome, there was no such thing as riparian sovereignty. They were public property, which had to be kept in order and improved; and for this purpose the Romans exacted dues, which were spent wholly and solely on the upkeep of the waterway. The Franks continued the same custom on the Rhine; but the Feudal system brought in a horde of petty princelings—as impecunious as German princelings have normally been—who completely upset the old *régime*, converted public into private property, and exacted every kind of tax and toll. Unfortunately, because Rhine and Danube had been frontiers for Rome, they had been associated with a strictly military control, and the legacy of this favoured the Feudal princelings—as it also helped to poison the whole political development along both rivers, for they got only the worst side of Roman civilisation. Now we must go back to the primitive conditions. If an international river is a world feature, then its world relation is the first consideration. In that case, riparians must tolerate representatives of the whole world, or of such parts of the world as are most concerned with the river, on the executive for the administration of the river. In most cases, moreover, riparian sovereignty must be limited, even in the interests of the riparians themselves, for the presence of non-riparians on the executive may be, and has been on the Danube, of the greatest value in minimising friction amongst the riparians. In this respect France has played a most honourable part, generally supported by Britain, especially on the Danube, where, *e.g.*, Austria tried to exclude Bavaria from the deliberations about the river, and to dominate and intimidate the representatives of the lower riparians. Indeed, it was only the day before yesterday that we had the gratification of reading the German decision to "exclude French and British representatives from the Danube Commission on the ground that they had hindered the ships of the more important nations from obtaining *priority* of treatment." What greater compliment could have been paid to us?

The fact only emphasises the vital point referred to above, that different parts of the same river have different conditions and may need different treatment, *i.e.*, that even riparians have not all naturally equal use of the river, and that the strongest or the most favourably situated can grossly misuse their opportunities. The Dutch showed this on the Rhine in 1816, and the Austrians on the Danube in 1856. Obviously, such differences are, in themselves, potential causes of serious trouble; riparians have not necessarily and naturally real equality even when the executive consists of only one representative from each riparian State. The greater opportunities of expansion, political and economic, on the lower river may favour the growth of a stronger Power; and the State with the largest share of the river or the best position on it has already advantage over the others. For instance, the Dutch on the Maas and the Russians on the Danube have indulged in "voluntary negligence"; it was in this way that Russia blocked the mouth of the Danube, and it is in this way that Holland makes it impossible for the Belgians to *continue* their commercial navigation on the Meuse down through Holland to the sea. A low riparian may no more monopolise or ruin navigation on the lower course of a river than a high riparian may poison or exhaust its upper waters. The river is a unit, and its unity is essential to the fulfilling of its duties in the evolution of world commerce; and, therefore, it needs a unity of administration. This is best secured by a commission of riparians and non-riparians, and such conditions facilitate the use of a river as a political boundary.

Nearly all the important details involved in the internationalising of navigable rivers have been illustrated already in the history of Rhine and Danube, and in both cases France has been an admirable guide to Europe. On the Rhine, as I have mentioned, she abolished in 1795 most of the restrictions which had made the river practically useless even to riparians; and that she was not thinking only of her own interests was proved by her attempt—defeated by Holland—to extend the freedom of the river to all nations in 1797. Again in the Convention of Paris (1804) France enforced unity of administration—sharing this with Germany on the ground that the river was of special concern to herself and Germany, as she has shared the administration of the Niger with us in recent years on the same ground.

The Rhine thus received a simple, just, uniform administration, which is a model for us now. All tolls were abolished except two—one on the boat and the other on the cargo—

which were to be only large enough to meet the upkeep of the waterway, and were to be used for no other purposes. These tolls could be paid in each political area with the coin of that area, but a fixed ratio was maintained between the various coinages.

Of course, in 1815, France was ousted from the bank of the river; and in the reorganisation elaborated by the Congress of Vienna, Von Humboldt, the Prussian representative, adroitly introduced into the regulations for the Central Commission of Riparian Representatives words which were afterwards made to mean exactly the opposite of the freedom enforced by France, and exactly the opposite of what our British diplomats at the time thought and said that they meant! Not only so; but during the sixteen long years while France remained more or less submerged, Holland was allowed to make the whole scheme ridiculous by the claim that "to the sea" did not mean "out into the sea," and that a tidal estuary was "sea." The Regulations of Mainz gave each riparian State full sovereignty over its own part of the river, and limited the right of pilotage to the subjects of riparian States; and in 1868 the Regulations of Mannheim further whittled down the old liberal principles of France—to the disadvantage of non-riparians, although they were admitted to rights of navigation. The Revised Rhine Navigation Treaty of that year was still in force in 1913, administered by the six riparian States—Holland, Prussia, Hesse, Baden, Bavaria, and Germany (as owning Alsace). Even since 1871 Prussia, as the strongest Power, has hampered the development of non-Prussian ports, using even the most childish tricks with pontoon bridges, choice of wharves, accessibility to rail, etc., against other German States.

Since 1871, too, the Rhine has illustrated another important point—namely, that the traffic on an inland waterway depends largely, perhaps vitally, on the extent to which railways are willing or forced to co-operate; and this has a present importance even from a purely international point of view. One of the results of the Franco-Prussian war was that Prussia bought up a number of private railways in the Rhine valley, and eventually used the profits of the transaction to make a secret fund for aggressive purposes. Now, if properly administered as an international waterway, the Rhine will be perfectly free except for trifling dues on boat or cargo for the expenses of upkeep; and it will compete so favourably with the Prussian railways that their rates will have to be reduced to a minimum. This will cut hard at such differential treatment as has handicapped British trade in the last twenty years, and it will leave no surplus with which the unscrupulous can juggle.

Of course, the Rhine is essentially linked with the Meuse and the Scheldt—politically, economically, historically; and the Powers have long been too lenient or too timid with Holland, possibly because her purely *legal* position appeals to lawyer politicians. The Dutch base their claims to monopolise the estuary of the Scheldt on the Treaty of Munster (1648), but have greatly strengthened their legal position in recent years. The marriage of the Dutch queen to a German princelet was followed immediately by the intrigue that ended in Belgium definitely granting to Holland, in 1892, special rights on the Scheldt in time of war, and Germany strongly supported Holland in getting these rights extended between 1905 and 1908. But the Scheldt is merely an international river; it is navigable into France, and it was only by France waiving her claims in 1839, and proposing a dual control by Belgium and Holland—like that of the Rhine by France and Germany at the beginning of the last century, and that of the Niger by France and ourselves now—that Holland ever obtained the power which she has abused. When Napoleon annexed Antwerp, he declared the Scheldt free; and the Rhine Regulations, when extended to the Scheldt, were interpreted as meaning "free for all flags out into the sea." Even so, the Dutch raised every possible difficulty, and navigation had no fair chance until the railway from Cologne to Antwerp brought in the only kind of influence which the Dutch seem to understand.

We have, therefore, full knowledge of all the essential conditions necessary to ensure the proper administration of international rivers, and shall have no kind of excuse if we are caught napping or misled by plausible and "interested" tricksters. Amongst their last tricks is "the great difficulty of policing such a river, where a German boat may be stopped by a French official." That is not more terrible than a Rumanian boat being stopped by an Austrian official; and the experience on the Danube shows that there is really no difficulty at all—for the simple reason that offenders are always dealt with, naturally and reasonably, by officials of their own nation, just as the various European Powers have the right of jurisdiction over their own subjects in the Belgian Congo. In Article 25 the effete and Pharisaical Berlin Act of 1884-5 provided that its regulations for the Congo "shall remain in force in time of war." To-day we are less ambitious, and desire only to further safe, easy, honourable, intercourse, in time of peace, between nations that are unequal in size and population, wealth and power, situation and relation to navigation facilities. We have seen that one small nation may ill-treat another small nation from stupidity almost as easily and as grossly as a large nation may ill-treat a small nation from tyranny. Under the circumstances it seems necessary to remove from both the stupid and the tyrannical, the opportunities for misusing such facilities; and the obvious way of doing this is to make international rivers international in use and in government. Commerce is already a prime factor in the evolution of Human Brotherhood. Progress towards that ideal may be gauged as well by the price of a banana or a piece of chocolate as by the number of sermons preached on the subject; the sea is already free, made so mainly by British perseverance in clearing it of pirates; it only remains to make navigable rivers equally free, and the opposition comes mainly from those who have talked most loudly about "the freedom of the seas." But "the freedom of the seas" does not mean that war is to be removed only from that element on which land power is weak, while the land power may still block access to the free sea by the natural avenue—the navigable river.

## Review.

"Practical Exercises on the Weather and Climate of the British Isles and North-west Europe." By W. F. Stacey, F.R.G.S., F.R.Met.Soc. Cambridge: University Press. 2/6 net. 64 pp.

This is a splendid little book—the work of an enthusiast. It is full of useful tables from which graphs could be made by the pupils, and there are a large number of exercises which, if worked by a pupil, would ensure him success in any questions which may be set at an examination for secondary schools. There are few schools where sufficient time could be allowed to work through all the exercises, but nevertheless the book would provide a good guide for the teacher. It would be an improvement to provide a chart for the pupil to fill in each day.

T. W. F. P.

# MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, BOURNEMOUTH, September 9th to 13th, 1919.

Report of the Delegate, T. W. Sowerbutts, submitted to a meeting of the Society held on October 7th, 1919.

The first visit of the British Association to Bournemouth, which will always be remembered as the first meeting after the War, was favoured throughout by glorious summer weather, enabling the visitors to see this charming town and its surroundings, in all their picturesque beauty and to the best advantage.

On the Tuesday evening, in the Winter Garden Pavilion, the Hon. Sir Charles A. Parsons, K.C.B., M.A., LL.D., D.Sc., F.R.S., delivered his Presidential Address, which was followed with close attention by an audience of nearly 1,500 members and friends. His main theme was the development and application of the science of engineering during the war with particular reference to new inventions and unforeseen developments of old ones.

The Mayoral reception was held also at the Winter Gardens on the Wednesday evening, while on Thursday night, at the same place, the ex-President, Sir Arthur Evans, M.A., LL.D., F.R.S., F.R.A., discoursed on "The Palace of Minos and the Prehistoric Civilization of Crete."

On Friday evening, again in the Winter Gardens, Mr. Sidney G. Brown, F.R.S., addressed the concluding meeting of the Association on "The Gyroscopic Compass," which was illustrated in a most interesting manner by various working models.

Altogether the 1919 meeting was an unqualified success, the attendance being much greater than had been anticipated, especially in view of the difficulties of travel and accommodation, and the impression left on the mind is that the value and importance of the papers read was certainly above the average.

Coming now to Section E (Geography) the President, Professor L. W. Lyde, M.A., gave an interesting address on

"The International Rivers of Europe," which, by his kind permission, is reproduced in our Journal. (See p. 40.)

Mr. R. Campbell Thompson, M.A., F.S.A., read an interesting paper on "Three Years with the Staff and Two Months Excavation in Mesopotamia." After describing his experiences and methods of work he continued:—

The results of the present excavations are of the greatest importance for the pre-history of Mesopotamia. Hitherto the two peoples known to have occupied ancient Babylonia about the third millennium B.C. were the Semites (Akkadians) in the north, and the Sumerians in the south. But a quantity of fragments of buff pottery, painted with black geometric designs, was found in these explorations at Abu Shahrain, and—although in far less quantity and sometimes only in coarse traces—even on the surface of five of the other mounds mentioned, which is exactly of the same kind as those found in the two lowest strata of Susa (the capital of Elam) and Mussian by the Dr. Morgan expedition. This Susian pottery, as is well known, bears a striking resemblance to pottery fragments found by the Pumpelly expedition to Anau about 300 miles E. of the Caspian. It is entirely distinct from either Sumerian or Semitic remains, and consequently we must now recognise the presence of a third people settled in very early times in this area in S. Babylonia, of the same stock as the peoples of Anau and Elam.

The stone implements of Abu Shahrain are numerous, and the expedition found quantities of flint, obsidian and crystal flakes, and about 400 chipped axe-heads similar in shape to those from Susa. Particularly noticeable even on the surface were the backed clay sickles, quite practicable for their work, and a large quantity of clay 'nails' always bent round at the point, similar to some found at Susa and Mussian. The large quantity of fresh-water mussels found in the strata, in contrast to the very few sea-shells, proves that the Persian Gulf was further from the mound than the great Euphrates lagoons.

From all indications it seems almost certain that these prehistoric Anau-Elamitic folk could not write. They must have been succeeded by the Sumerians, three kings of whom—Ur-Engur (*c.* 2400 B.C.), Bur-Sin (*c.* 2350 B.C.), and Nur-Adad (*c.* 2175 B.C.)—left inscribed bricks telling of their restoration of the *zigurrat*.

This paper was followed by one on "Surveys in Mesopotamia during the War," by Lieut.-Colonel G. A. Beazeley, D.S.O., R.E. After remarking that Mesopotamia was unsurveyed before the advent of the Expeditionary Force, and describing the personnel and organisation, he said:—

The latitude and longitude of Fao at the mouth of the Shatt-el-Arab had been previously accurately determined by the Survey of India. The longitudes of Baghdad and Kermanshah were determined by wireless from Fao, the latitude of these places being known. On these co-ordinates the whole of the triangulation carried out was based.

No Geodetic triangulation was attempted, the destructive proclivities of the Arab and the flat nature and unsettled state of the country putting all scientific survey out of the question. All that could be attained was a general map of as large an area as possible on the ½-inch scale, larger scales being used wherever required by the military authorities. Triangulation was for the most part confined to the more important rivers, the deserts and swamps elsewhere making more than a few extensions impossible; strong escorts were required, and transport on a liberal scale for water and rations had to be provided whenever the rivers were left.

The flat nature of the country made triangulation very difficult, involving a very large number of short-sided triangles; mounds were only occasionally met with. Mirage also greatly hampered the work; in the hot weather distant objects frequently disappeared at 10 a.m. and did not reappear till about 4.30 p.m. Under these circumstances it was impossible at times for the triangulation to keep pace with rapidly moving columns, and recourse had to be made to measuring distances by means of cyclometers fitted to bicycle wheels. As soon as the triangulation was pushed up behind the moving columns the scattered bits of survey based on (*a*) triangulation, (*b*) measuring wheels, were linked up and adjusted, more complete surveys of the areas covered being subsequently carried out.

An interesting experiment was tried by map compilation at Baghdad, which was quite successful, *i.e.*: A 12-inch survey of the city based on air-photographs tied down to fixed points. The map was completed in about a fortnight. To have carried the same operation out by ground survey would have taken several weeks. When photographing from the air the neighbourhood of Samarrah in connection with a large-scale survey required by the military authorities, the outline in detail of a very large ancient city was revealed; the traces of walls, foundations, public gardens, etc., which were not visible to anyone on the ground showed up quite plainly on the photographs, and revealed the fact that surveys of areas for archæological research can in future be greatly assisted by air-photography.

A rapid means of topographical sketching from an aeroplane was evolved by Col. Beazeley to take the place of air-photography over unmapped areas when time does not permit the latter process. By this method a map of the ground over which operations are contemplated can be very rapidly prepared and issued to the troops beforehand. Colonel Beazeley's aeroplane was shot down and he was captured by the Turks, stopping the work. Further experiments are now being carried out. The method is applicable to unsurveyed areas in arid countries when it is not desirable to incur the expense of air-photographic surveying.

In dealing with " The Future of Turkey " Mr. H. Charles Woods pointed out that :—

History has proved that the Near East has been the scene of, and the cause of, war after war, and from the moment of the entry of Turkey on the side of the Central Powers the problems connected with her future have been among the most important questions to come up for settlement by the Peace Conference.

For the purposes of that settlement Turkey means not only the areas which formed an actual parta of the Ottoman Dominions at the time of the outbreak of the war but also the Ægean Islands, especially those occupied by Italy after the Turco-Italian campaign, the Island of Cyprus, and last, but not least, the districts of Erivan, Kars and Batum, annexed by Russia after the war of 1877-1878.

Two principal conditions must be fulfilled in these areas. Firstly, safeguards must be established against a continued or a renewed danger of Pan-German control in territories the domination over which formed a prominent part of the 'Drang nach Osten.' And, Secondly, the misgovernment and oppression carried on or permitted by the Turkish Government must cease.

These being the areas under discussion and the conditions to be realised, it will be found that there are certain already existing arrangements possessed of an influence upon the future. Among these arrangements, the effect of which is given in the paper, are the Treaty of Lausanne, the decision of the London Ambassadorial Conference in regard to the Ægean Islands, the then secret Treaty made with Italy in 1915, the agreement made between Great Britain, France, and Russia in the spring of 1916, and, lastly, the terms of the armistice and the clause of the League of Nations Covenant which abrogates all obligations between members inconsistent with its terms.

Numerous factors influence the future of Constantinople and the Straits, and there are various reasons for and against the prolongation of the existence of Turkey as a Great Power. In favour of internationalisation, or at least of international control on the Bosphorus, would be the creation in Asiatic Turkey of a number of new States entirely independent of Turkey, or of the establishment of a series of autonomous areas, in which, whilst the Turkish flag might continue to fly, each of the nationalities would be given the fullest measures of self-government under the League of Nations or one of its mandatories.

The natures of the different States, or autonomous areas and their possible frontiers, present great difficulties, owing to the mixed population and to the rival claims which exist. Whatever, therefore, may be the subdivisions of the Ottoman Empire agreed to by the Peace Conference, as the populations of all the new States must remain mixed, steps should be taken to establish absolute equality before the law for minorities and majorities, for Christians and for Moslems.

In conclusion, two vastly important questions must come up for settlement in connection with the future of Turkey. The first concerns the regularisation, and, if possible, the unification, of the several systems of jurisprudence existing in the Ottoman Empire—systems necessarily to be inherited by any newly-created States, unless measures be taken to put an end to or to modify them. And the second is bound up with the financial position of the country—her pre-war public debt and other liabilities a position which must receive the most careful consideration if precautions are to be taken to prevent these burdens from being unfairly distributed in the future.

Miss Marion I. Newbigin, D.Sc., dealt with "Some

Geographical Aspects of Nationality or Internationalism," which may be summarised as follows :—

In one of its aspects the war was a conflict between the older ideals associated with the National State and the newer conception of Internationalism, based upon the development of modern industry. Broadly speaking, it may be said that the former so far has conquered in the western section of the Continent, with its great diversity of surface and the latter in the wide uniform plains of the east. For while Belgium has been restored and France re-established in her old boundaries, the aims of the party still dominant in Russia are definitely anti-national. Thus while the internationalists aimed at substituting for the old-established National States of the west a greater unit with a purely economic basis, their success has been limited to a region where neither nationality nor modern industry has attained full development. Similarly, whereas the internationalists claim that just as the National State rose from local groups or separate city States, as the result of an improvement in communications, so the greater unit of the future is the inevitable consequence of modern means of transport ; in point of fact, their doctrines so far have only prospered in an area where these are poorly developed. The paper examines the factors which have determined the use of National States and endeavours to show that these are a response to largely unalterable physical conditions, and are therefore destined, in one form or another, to persist as against the conception of the industrialised International State.

Miss M. A. Czaplicka discussed " Ethnic versus Economic Frontiers in Poland," and Mr. O. H. T. Rishbeth read a paper on " The Dodecanese," both of which were valuable contributions to the discussion of after war settlements.

Dr. Vaughan Cornish discussing " The Geography of Imperial Defence " stated that

International security is founded on the fact that no Government commands nearly half the population and resources of the world, so that none can engage the rest with a prospect of success. Consequently, the one purpose common to the foreign policy of each Government is the prevention of dangerous preponderance by any other. At present there are about fifty Soverign States, of which seven administer about two-thirds of the world and its population. Of the remaining third the Chinese constitute one-half, so that the minor States, about forty in number, have only one-quarter the population of the seven Great Powers. Consequently, strategic geography to-day is concerned chiefly with the territorial relations of the Great Powers, and with certain strategic positions between their territories which are in the occupation of lesser States. The British nation is unique in its geographical condition, for it alone occupies racial homes on each ocean. Consequently, before the national army can be concentrated, parts of it must be conveyed great distances by sea, which can only be achieved in security if a supreme navy be maintained. All other nations can concentrate their armies by railway, and therefore to none of them is a supreme navy essential, as it is to the British. A second peculiarity of the British Empire is the inclusion of the vast Indian population. For each British subject there are in the world only three foreigners, a fact which by itself goes far to provide a humanitarian justification of that supreme navy on which the continuance of the Empire depends.

After describing the various conditions of strength and weakness, the world over, he concluded :—

The real vulnerability of Great Britain is not to invasion but starvation by blockade. The area *per capita* is less than half that of France, which country has only just enough land to feed its people. No system of farming at present generally practised will make Great Britain independent of foreign food. This comes across the North Atlantic and Bay of Biscay, since Western Europe has little to spare. Even if there were through railway communication by a Channel tunnel, supplies by this route would be dependent on the grace of foreign Powers. Thus if Ireland be governed separately from Great Britain the subsistance of the population of the latter would be dependent on the controllers of the Western Island, which flanks the routes from the ocean, and is at present the naval outpost of the United Kingdom. The passages past the Irish coasts are also the routes by which reinforcements and munitions must be sent to the Dominions and territories beyond the ocean from Great Britain, the main recruiting and munition base of the Empire. Thus if Ireland and Great Britain were politically separated neither Great Britain nor the outlying Dominions and territories would be strategically secure.

Mr. C. B. Fawcett, B.Litt., M.Sc., introduced for discussion "Geographical Aspects of Devolution," in the course of which he said :—

The prominence of devolution during this time of reconstruction might be ascribed to three principal causes, namely (1) the strength and urgency of the Irish demand for some form of Home Rule and the existence and growing strength of similar demands in Scotland and Wales; (2) the congestion of business in Parliament and the fact that the present Parliament is obviously unable to cope with all the tasks which fall to it; (3) the increasing realisation that our counties and county boroughs are too small in area and in the authority of their councils. Several of our larger provincial cities had already become well developed regional capitals, centres of the economic and social life and thought of populous regions. Among these were Newcastle-on-Tyne, Leeds, Sheffield, Nottingham, Manchester, Birmingham and Bristol. Each of these was also an important centre in our road and railway systems, a university town, and the seat of an important press. Hence each could well serve as a capital for one of the provinces.

The discussion was continued by Professor Peake, Miss Newbigin, Mr. G. G. Chisholm, Professor Fleure and Mr. E. A. Reeves.

An exceedingly interesting paper on "The Site of Westminster" was read by Miss H. Rodwell Jones. Colonel Fowler, R.E., described "Some of the Conditions Governing the Selection of an Aerial Route":—

An abstract of the requirements is as follows. The various items being considered individually, that route giving the best average fulfilment would be the one selected.

1. The first requirements is safety.

Oversea flights in a land machine should, if possible, be not longer than half the distance a machine can glide, without her engine, from the height at which it is customary to fly.

A suitable number of possible landing places available so that in the event of engine failure a machine will, at any time, be within gliding distance of at least one. Good and frequent meteorological information obtainable when required so that risk of accident through sudden formation of fog and mist may be small.

2. The second requirement is speed.

The distance from the starting point to the destination should be the shortest possible in order to economise in time and fuel.

In the event of a forced landing the telegraph and railway should be near so as to be available to immediately forward news of the position and requirements of the aeroplane. Another machine can then be sent to complete the journey with the passengers or merchandise or again the necessary spare parts for the repair of the machine which has landed can be sent by air or rail.

The requirements as to communication may in many instances be fulfilled by the wireless telegraph or telephone installation carried in the machine.

3. The third requirement is that the route shall have a number of distinctive landmarks to help the pilot in his navigation by recognition of position.

Mr. Trevor-Battye read a paper on Crete, and Sir Alfred Sharpe, K.C.M.G., on "Colonisation in Africa," while Mr. E. A. Reeves brought forward some new experiments in Atmospheric Electricity and possible connection with Terrestrial Magnetism. Colonel Winterbottom, R.E., and Captain H. Hamshaw Thomas dealt with Air Photography, particularly with relation to rapid methods of survey.

The proceedings of the Geographical Section were brought to a close by a paper on Persia by Lieut.-Colonel G. S. F. Napier.

The Conference of Delegates of Corresponding Societies was held on Thursday and Friday afternoons.

Lord Montagu of Beaulieu, in his presidential address, dealt with the question of roads and the history of locomotion. He said that to the majority of road lovers and road users the placing of roads under the domination of a Ministry composed almost entirely of railway officials was a retrograde step. For many reasons, among which was the high price of labour, road transport in this small island of ours would in future be the cheapest and most convenient method of carrying passengers and goods. We were at present in the transition stage, and nothing but experience and economic facts could decide how much traffic was to be road-borne and how much railway-borne. It was to be hoped that the new Ministry would rise above the pro-railway bias with which it was credited.

The question of "Atmospheric Pollution of Towns" was introduced by Dr. J. S. Owens, M.D., and was discussed on both afternoons, on the Friday particularly with relation to a paper on "Measurement of Rain," read by Mr. de Carle Salter, in the course of which the Delegates were urged to secure an increase, in their respective districts, of stations for the recording and measurement both of rainfall and atmospheric pollution, which it was suggested might in some cases be conducted concurrently, with advantage.

In the absence of Mr. T. W. F. Parkinson, M.Sc., F.G.S., Hon. Secretary of the Manchester Geographical Society, your delegate read the following paper prepared by Mr. Parkinson :

### GEOGRAPHY IN THE CURRICULUM OF HIGHER EDUCATION.

Some years ago geography had no place in the great public schools. The text books were bad, and consisted of names and statistics which bored the teacher and made the subject hateful to the pupil. Much had to be learnt by heart or maps had to be drawn for homework because they were easily marked. It would be difficult to say how often the map of Palestine, showing various features, the chief towns, the tribes, etc., or the journeys of St. Paul were shown on maps. These were often set at the week-end so that no sin would be committed by drawing them on the Sunday.

The elementary schools had a hard grind at facts. Names were crammed in and heights of mountains, depths of seas, lengths of rivers and size of lakes were known. A boy of 10 was supposed to know every county in England and its capital. A lot of useless information made the subject despised.

During the last twenty years a great change has taken place in this country, and five years ago we could say that the teaching of geography was better in the elementary schools of England than in any country in Europe. It had become more scientific. The causes were given to explain the facts. Writings of travellers, explorers and traders were used in many schools. Good maps showing the physical features were used instead of maps crowded with names. Apparatus was obtained or made by the teacher to explain the facts he taught.

Even to-day our elementary schools—urged on by enthusiasts both in the profession and out of it—have a curriculum in geography second to none, and the thanks of teachers to the Board of Education for their admirable scheme of geography for these elementary schools is not grudgingly given.

It is not so, however, in the higher schools. True the Board demand a certain amount of geography in every secondary school receiving Government grants, but in many cases this is the minimum which the pupils receive. Nor is geography always as well taught in these schools as might be desirable. In our public schools the upper forms receive little or no instruction in geography in many cases.

Until a few years ago geography was not compulsory in the training colleges for elementary teachers, in spite of the enthusiasm for the subject in the elementary schools. It was usually coupled with history, and on one paper which the author saw the geography was complete in the following question: "Draw a map of England and mark the sites of the chief battles in the War of the Roses." This has now been changed.

In the universities geography has some place, but there are few professors, the lecturers are usually badly paid, the equipment is bad, there are not "honours" courses in all the universities, and hence geography suffers. Moreover, the Board of Education has recently advocated what are known as advanced courses in the best secondary schools. English, mathematics, science, classics, modern languages, have a place, but at first geography was excluded, and even now is only regarded as an advanced subject under very special conditions.

These facts are not good for education as a whole, nor for the subject of geography in particular. The President of the Board of Education wrote the President of the Manchester Geographical Society stating that there were not sufficient geography specialists to warrant the Board in advocating advanced courses in geography. Rarely are teachers prepared for a subject which does not exist. Let the Board sanction the advanced courses in geography, and there will be an adequate supply of teachers in a short time.

Probably there never was a time in the history of man when geography was so necessary as at present. No country is self-contained. Each is necessary for all and all are necessary for each. This is especially true for the British nation. We have the largest empire the world has ever seen. We boast the sun never sets on the British Empire and that it is always summer in one part or other of the British Empire. We control the lives of more people than have ever formed one empire before, and these have different languages, different manners, customs, dress, and show all grades of civilisation and culture. Unless we know more of this empire, and this is geography, we are unworthy of the trust which is imposed upon us.

How can we expect the respect of Canadians, Australians, South Africans and Hindus when we know so little of them and their countries and make such small efforts to know more?

The time seems ripe for a great step forward in the teaching of geography. The great war has brought home to us the size and importance of our Empire, but we are now in danger of falling back into the old groove. Even at the Peace Conference peoples, towns and countries were discussed and settled when some of the members had never heard of either the places or the people. Boundaries have been drawn without any regard to the geographical conditions.

Geographical conditions alone made India a garden protected by the mountains and the sea for a time, but when men had learned to navigate the seas and to negotiate the mountain passes India lost her natural protection and fell a prey to invading hordes who envied the natives their rich land. Mesopotamia, owing its greatness to its position near great rivers, rose and declined, but will rise again by a study of its climate and by the application of science to its agriculture. Egypt—that fertile strip in the desert—became a great land through geographical conditions. Greece, Rome and Spain all rose because favourable conditions prevailed, but failure to keep pace with the times led to their decline.

Is it not also possible that our own Empire may fail when it has the power to be the greatest factor in the world's progress? Every statesman should know his geography well. Every official in our Government departments should have had a thorough training in the school of geography. It may be truthfully said that not one per cent. of the officials in the higher Civil Service have ever studeid geography seriously since their schooldays. Not long ago the subject was not even among those for examination. Map making has been left to the army and navy ordnance survey departments. The Board of Trade officials should be expert geographers. There should without doubt be a geographer at the Ministry of Transport.

Our trade is carried on with every country in the world. We have been nicknamed "a nation of shopkeepers," and it is a marvel to any thinking man how we have acquired our markets, and especially how we manage to keep them.

Surely there is a great field for geography teaching in the upper part of the secondary school and in the university, and the tendency to make the subject a branch of history or of commerce is not altogether advisable. It is necessary for commerce but is not really a part of it. Geography may be called a synoptic science since it obtains much of its data from other sciences and it is as old as man himself. The relationship between man and his environment made the study of geography a necessity. Man was, in fact, "controlled" by geography, and only by a study of the subject can man suit himself to this control. Land forms and climatic conditions, and the vegetation resulting from these, have accounted for all the differences of the races, for the rise of industry and the development of commerce. It is only in proportion to our power to overcome the disabilities of our environment that we rise above the level of the savage.

Surely it is necessary to study geography if a right conception of our obligations is to be obtained. Practically all historical teaching should have a geographical basis, and if commerce is to be carried on in a less spasmodic fashion than in the past a knowledge of geography must be acquired by all our great commercial leaders.

It appears necessary that an honours course in geography be established in all our universities with professors and lecturers like the other leading subjects of a university course. Until this is done the secondary schools will never supply the students in geography except as teachers in elementary schools or where the subject is compulsory as in most of our schools of commerce.

One of His Majesty's Inspectors once said that any boy could acquire all the geographical knowledge he required. Could not this be said of any subject with equal truth? His point was—that there was no call for the subject since there were no scholarships at the universities and no schools there to which a student with geographical inclinations could attach himself. The schools could gain no "éclat" by passing boys through a geographical course. As he said, "the subject leads nowhere."

At the present moment geography needs a man of strong ideas—an enthusiast who could make *his* ideas acceptable to others. Whether this man be an official of the Board of Education, a leader in our universities, or a common teacher, he has a task which would well repay his efforts. He has a subject which is bound to be of importance in the next few years. Geography will determine the boundaries of states, the governments of peoples, the development of trade and commerce, and the rise of new industries.

The opening of new trade routes and the improvement of the old also calls for attention from the geographer. Mr. Fairgrieve has said that geographical control is no less potent because it is obscure, hence the necessity of a skilled geographer in almost all our great commercial undertakings.

From the standpoint of examinations some change is desirable. As an examiner in university and scholarship examination together with many years' teaching experience in secondary schools and training colleges the author can claim some knowledge of the baneful effect of present day examinations in geography.

Most secondary schools prepare pupils in the upper forms for the matriculation examinations of some university. Would it not be possible to have a more uniform syllabus for all the universities. It is practically impossible to prepare a mixed class for the matriculation, the preliminary certificate and the Oxford senior in the subject of geography.

But even if there were no examinations and no scholarships and no degrees for the students of geography the subject has a fascination for most boys and girls in the upper forms of a secondary school. It is not so difficult as the classics or mathematics, and many will take a keen interest in a geography course when there is no examination in view. But it cannot be left for anyone to teach. Geography is a synoptic science. It touches on so many different subjects and forms a meeting ground for these. Only the specialist can be allowed to determine the boundaries of the subject of geography. He may not be called upon to verify the laws which he uses to support his facts, but he alone can know how to use these laws for his particular work so as to produce a harmonious relationship between man and his environment.

It is the very fact that geography encroaches upon so many subjects that makes it such a valuable school subject. Our outlook upon the world depends upon our culture, and the mightiness of our Empire must inevitably depend upon our power to recognise that geographical factors have controlled the rise and the fall of great empires even before our day.

Your Delegate then concluded as follows:—

I should like to emphasise what in my opinion is required. We want more men with the unbounded enthusiasm and activity in the cause of Geography as exemplified by the late Professor Herbertson. If we could capture some wandering Carnegie, and persuade him to endow Chairs of Geography at the various universities, where it has not already been done, with an adequate number of scholarships, the problem might be solved.

But in the absence of such benefactor or benefactors, is it not the duty of the Government to ensure that the teaching of so important a subject is adequately provided for and properly encouraged, so that in our schemes of reconstruction one great drawback to our economical, political and commercial progress may be remedied? For depend upon it, a full and scientific knowledge of Geography will be more than ever necessary in the immediate future.

If Professor Fleure had not unfortunately had to return home yesterday he would have been here this afternoon. He has authorised me to suggest on his behalf that the Minister of Education should be pressed to appoint a Departmental Committee on Geography as he has already done in the case of History and other subjects.

Professor Myres and Mr. Peake also desire me to state that it is only their duties in another part of the building which prevents their being present, to support very strongly the views here laid before you.

The subject was fully discussed by Mr. C. B. Fawcett, of Leeds University, Colonel A. Burton Brown, Mr. G. G. Chisholm, of Edinburgh, who incidentally laid down a much appreciated definition of Geography, Mr. J. E. Liddiard, of Bournemouth, Dr. Vauhgan Cornish, Rev. J. O. Bevan, Sir Edward Brabrook, C.B., and Dr. W. E. Hoyle, Cardiff, who urged the importance of devoting our energies to one object and so getting something done. Eventually your delegate proposed the following resolution:—

> "That it be a recommendation from this Conference of Delegates to the Council of the Association to suggest to the Board of Education the desirability of holding an Enquiry into the Teaching of Geography on similar lines to those already held on History and other subjects."

This was seconded by Sir Edward Brabrook, C.B., and carried, thus bringing to a close the proceedings of the Conference for 1919.

*Lafayette, Manchester.*]

F. ZIMMERN, F.R.G.S.

# F. ZIMMERN, F.R.G.S.

Fritz Zimmern, Chairman of the Manchester Geographical Society, whose loss the Society has deeply to mourn, was born at Heidelberg in 1846, and after a boyhood spent in his native town, and later in Frankfort, came to England at the age of 19. After a short period at Bradford, in the employ of Messrs. Reiss Bros., he finally settled in Manchester, which remained his home until the time of his death on June 7th, 1919.

Mr. Zimmern's first business connections in Manchester were with a Heidelberg friend, but later he joined the firm of Steinthal and Co., and in 1875 he married the daughter of Mr. H. M. Steinthal, the head of the firm, and in the same year became a naturalized British subject. The nature of the business necessitated a considerable amount of travelling, and a full share of this fell to the lot of Mr. Zimmern, who every year had to pay various visits to the Continent and occasionally to make longer journeys, as to Egypt and also to India.

Mr. Zimmern was a man of wide interests and keen human sympathies, and wherever he went he was sure to gather a harvest of interesting experiences and to add to the number of his many friends, while all the time he was adding to his store of knowledge both of men and places, which led to his interest in the subject of geography and his belief in the importance of such work as is being carried on by the Manchester Geographical Society.

At the foundation of the Society, in 1884, he became Hon. Secretary in conjunction with Mr. Gallé, and threw himself heartily into the various schemes for its development and expansion. This office he retained until 1908, when he became Vice-Chairman of the Council.

Whether in raising funds for the purpose of the Society or in wise thoughts on the policy to be pursued or in rousing the interests of others on behalf of its objects, Mr. Zimmern proved to be an indefatigable worker.

He rejoiced also in welcoming at his home, where his wife's hospitality seconded him, many of the travellers who came to lecture to the Geographical Society, and we may mention that, among others, he entertained Vambèry, Aurel Stein, Mikkelson, Boyd Alexander, Sir Harry Johnston, Captain Scott and Sir D. Shackleton, and some of these on more than one occasion. His geniality and wide sympathies made him an ideal host on such occasions.

In 1909 he became a Fellow of the Royal Geographical Society, and in the following year he was elected as Chairman of Council of the Manchester Geographical Society, which office he filled until the end of his life.

For a great number of years Mr. Zimmern was a member of the Boards of the District Provident and of the Distressed Foreigners' Aid Society, and when the war broke out in 1914 he took upon himself the organisation of help for the wives and families of interned foreigners, who through no fault of their own found themselves deprived of their means of livelihood. It proved an immense task, and there is no doubt that the intense strain on his sympathetic nature and the unending work of administering relief broke down his health and caused the heart failure to which he finally succumbed.

It may be truly said of Mr. Zimmern that he laid down his life for others.

*Lafayette, Manchester.*]

HARRY SOWERBUTTS, A.R.C.Sc.

# HARRY SOWERBUTTS, A.R.C.Sc

## A Memoir and an Appreciation.

Not a sadder task has fallen to our pen for many a day than that now before it. With almost tragic suddenness, in the prime of his life, passed from our very midst on the 13th of February, 1919, Mr. Harry Sowerbutts, our Secretary, a member for 30 years, and "Victorian" treasurer.

Mr. Sowerbutts, Mr. Harry as he was familiarly, to many of us affectionately, known, was the second son of the late Eli Sowerbutts, founder of the Society and for 20 years its secretary. Mr. Sowerbutts took up the duties of secretary on the death of his father in 1904, retaining his former mark of office, assistant-secretary, which for long he had been to his father. In 1909 he was officially appointed secretary. Well do we remember the occasion. Even now, at this moment, we feel, almost as he did then, the frank and buoyant delight which was his when the Council of the Society thus recognized his merit and success, and his enthusiasm for the work.

Mr. Sowerbutts had intimate association with the Society almost from the very day of its inception. Many members can readily go back to the year 1887 when the late Eli Sowerbutts gathered round him that band of stalwart, ardent and clever workers for the cause of geography, who because of the year of their formation styled themselves "Victorians," whose work was so wonderfully varietal, so remarkably prolific, so practical, thorough and far-reaching in effect, that more than the echo of it of that time remains to-day. Of these Mr. Sowerbutts was one of the hardest and most serious workers. We would have past records bear tribute to our old friend, guide and fellow-member. With pride in our pleasure we therefore venture to extract the following report from the Society's Journal of 1895 :—"The writer of this report (it was written 24 years ago be it noted) would again draw the attention of the members to the very valuable and self-sacrificing work which is carried on by one of the "Victorians" . . . . . It is felt that the members hardly realise how much they owe to the enthusiastic devotion of one who works with untiring zeal for the general good in a most retiring and unostentatious manner."

Mr. Sowerbutts' scientific knowledge, his skill in photography, his work with the lantern, his lantern-slide making, and his many other attributes, not only made him indispensable, but were the base from and upon which this fine body of workers, the " Victorians," largely built up and maintained their success, a success which resounded far beyond the confines of Manchester. As a lecturer Mr. Sowerbutts never sought prominence. His place he made at the lantern and with its corollaries, and as organiser. Many hundreds of miles in those days did he transport his lantern and outfit, packing up and unpacking in turn, fixing and adjusting both apparatus and screen before each meeting and removing after, tasks much heavier and more thankless than the working of the lantern, yet unrecognized save by his co-workers. Even now, after so many years, it would not be difficult at the hour of midnight and later to imagine we heard him arriving home from one of his arduous evenings away at lectures. But who shall say the satisfaction of his work did not amply reward him, for in those days, there being no cinemas, the " magic " lantern was a means of sound enjoyment as well as a power for good. As he worked then, so in other ways he worked right through the years after—to within, even, five days of his death.

In 1897, on the occasion of his marriage, we have further proof of the admiration he impelled. An illuminated address to him from members of the Society and the " Victorians " tells of " services unostentatiously rendered," of " generous and unobtrusive help efficiently accomplished with such modest but finished thoroughness," and so on. His reward for " services rendered " was the innate knowledge and gratification of achievement, of success. Meet is it therefore such testimony should find vent in emblazoned characters.

Worthy man was he then to occupy the important position of secretary to the Society, vacant through the death of his father, a position which was generally felt to be most difficult, if not impossible, to fill. In fact, the passing of that doyen among geographers, Eli Sowerbutts, the man who breathed life into the Manchester Geographical Society and was afterwards its very breath, seemed almost to foreshadow the obverse of success for the future. We do not say Mr. Sowerbutts succeeded at once. From his own lips we had it he did not.

Neither could it have been given to any man to do so, nor to any man to hope for. It is true he had many of his father's characteristics, frankness and fearlessness among them, but he had not his matureness of years. Notwithtanding, the work of the Society, as with all else his hand found to do, was done with all his might. And let us here put on record, he succeeded beyond the expectations of his closest friends and admirers long before he was called away. He drew to him, and inspired, many members of the Society—older as well as younger than he—some to do one thing, some another, to study and lecture, to travel and lecture, to become interested workers in photography, to love and expound the knowledge found in good books of exploration, travel, research, etc., and to write of what they knew—in short, to put geography and its concomitants, and equally the Manchester Geographical Society, before all else. He was, as is said, " heart and soul " in his work.

He had wish, which we well knew, to devote his time, wholly and voluntarily, to carrying on and into effect the great work of his father. But time was not given him to make either possible, though how much of his days, of his evenings, often of his nights, he gave to the Society and its work only those few know who through long years were fortunate in his close personal friendship. Ever was he thinking, ever planning that he might put before his Council schemes which he hoped would increase the membership or add to the financial strength of the Society, thus to amplify the Society's objects, and bring about their earlier and greater attainment. He had equally at heart the great functions and possibilities of the Journal and the library. Before all things he put the dispensation of geography and its kindred sciences. And his burning desire was to see the Manchester Geographical Society one of the most powerful factors in diffusing that knowledge.

Perhaps most admirable of all was his quiet though distinctly definite manner of carrying into effect the work of the Society. Most adorable of all, his delight in the talents of others. Himself he sought to walk in the shade. His own results he would darken, if doing so he could throw into greater relief the ideals and work of others. He was completely destitute of ostentation. His sincerity was of a kind rare. Trouble was something he seemed, if to know, to disregard. He worked for all with unceasing and apparently inexhaustible energy. To his inspiration, for his example, his help, and in many another way, there are those of us, and not few in number, who owe him much. How much we can never tell. He has left us far, far too early.

As a young man he displayed exceptional talent. A scholarship gained in Manchester took him to the Royal College of Science, where his work secured him the degree of associate. But a frail constitution compelled his dissolution from the profession he had set his heart upon. It was that frailty which now, so long after, coupled with failure to correctly estimate his own strength, frustrated recovery from an illness rarely fatal. Of no man can it be said with greater truth than of him, that he gave himself for his life's work. The greatest tribute we feel we can pay him, the finest monument we can raise to his memory, is the continuance with renewed vigour of the work of building up the Manchester Geographical Society to be a greater power than ever, not alone in our own city, not alone in our own land, but the length and breadth of every land. As much as we always feel the spirit of his beloved father to be with us, so too must his be ever-present.

Mr. Sowerbutts, let us add, has left us a legacy greatest of the great—a splendid example of high moral courage, fearless uprightness, transparent honesty, sincerity of purpose, steadfast friendship; he had a kindly nature, he was a doer of good deeds. Only now when the race of life has been run can we picture him in perspective, only now do we awake to realise how great our esteem for him. The chasm his death leaves is wide and deep. To some of us it does at times seem without confine.

Much more of him could we unfold, though much we would appear to have written.

He leaves behind him a widow and one son, a bright little fellow of six.

It gives us some consolation that the family name and direct influence of the founder of the Manchester Geographical Society, Eli Sowerbutts, should remain with us in the person of his eldest son, Mr. T. W. Sowerbutts, who succeeds to the secretaryship.

# Reviews.

"Man: Past and Present." By A. H. KEANE. Revised and largely re-written by A. HINGSTON QUIGGIN, LILIAN WHITEHOUSE, and A. C. HADDON. Cambridge: University Press. 36/-.

THIS revision of Professor Keane's smaller volume, published in 1899, is probably the most complete and valuable contribution to the study of anthropology and ethnology which has yet been produced. Owing to the considerable progress made in recent years due to discoveries of primeval remains and to the great extension of the study of all branches of geographical science at our universities, as well as to the careful research and practical work performed by such men as Dr. Haddon himself, Mr. Flinders Petrie, Sir Harry Johnston, Mr. W. J. Sollas, M. Boule, Mr. C. Dawson, Mr. Smith Woodward, Mr. W. K. Gregory and many others, our knowledge of the rise of man and of his distribution over the earth is becoming more definite and at the same time more complex year by year.

As Keith says in his "Antiquity of Man," we are rapidly receding from the view embraced in our first youthful burst of Darwinianism, when it appeared that evolution was a simple procession of forms leading from ape to man, for we now are able to conceive an ancient world in which the family of man was broken up into narrow groups or genera, each genus being divided into a number of species. Then, out of that great welter of forms one species became dominant and ultimately the sole survivor—the species represented by the modern races of man. The first two chapters of this volume describe in a clear and concise manner with copious notes and references, the ascent of man from the variety of forms of the early Pleistocene epoch, via the predominant species, Neandertal and Aurignacian man, and finally the latter form alone, through the slowly ascending cultural periods of the old and new Stone Ages, the Copper, Bronze and Iron Ages, the Pre-historic and finally Historic times.

At the end of Chapter II one is interested to note that the authors' classification of mankind has not been based on the bony structure of zoological groupings, but on the external characteristics of colour and expression, and, above all, of hair, thus gaining a simplicity without involving any particular theory of racial or geographical origin.

Throughout the remaining thirteen chapters the plan has been adopted of summarising under heads the prevailing characteristics, the range, the cultural associations and the sub-divisions of the various human groupings. These are then followed by a more detailed historical account of the origin and development of the races included within the group, and it is worthy of note that almost every page emphasises the great directing and influencing power of geographical environment on the development of man. In this connection one reads with great interest such passages as that on Malayan folklore, the various references to marriage customs, and the remarks on standards of morality—questions which are discussed in some detail in Miss Semple's work, "The Influences of Geographical Environment."

It is perhaps to be regretted that in the chapters on the African Negro the opinions of some modern authorities on certain points have not been consulted. Professor Keane's original statements regarding the distribution and naming of Bantu tribes and on questions concerning linguistic connections have been adhered to, although Keane was not an expert on these points, and his statements are based on the limited knowledge of twenty years ago. Sir Harry Johnston published an authoritative work last year in which a number of the assertions on these points in this volume are disputed and in some cases shown to be erroneous. Johnston also differs from the producers of this volume and incidentally from most other anthropologists in his views on the non-extinction of the Cuban aborigines. He holds that the photographs of natives taken by himself disprove the prevailing theory of extinction, and that the mistake has arisen through the fact of the natives' change of speech and religion.

The chapters on the Northern Mongols are almost fascinating in their interest, and they throw into clear light the homogeneous character of such races as the Japanese, while the short discussions on the religions of the various groupings are decidedly valuable. Here still seems to be divergence of opinion between geologists and biologists on the question of the linking up by land of Asia and America; but the similarity of the fauna of the two continental margins seems to argue very decisively in favour of, at any rate, a post-glacial connection between British Columbia and Northern China, while the marked resemblance that exists between the Mongols of China, the so-called Indians of North America and the Eskimos of the North American Tundra and Greenland is an additional evidential circumstance.

Chapter XV contains an admirable descriptive account of the peopling of Britain and the formation of the English nation, with a succinct but appreciative paragraph on the English language. In the former connection, however, the writers seem to lend credence to the opinion of Kuno Meyer that "no Gael (*i.e.* Q. Celt) ever set foot on British soil save by a vessel that had put out from Ireland," whereas there seems to be no reliable evidence for such an assertion. It seems clear that all colonisation of Ireland has occurred from Western Britain and that Britain itself received its human influx from Gaul, Germany and Norway.

Near the end of the volume is an appendix by Mr. W. K. Gregory, the American anthropologist, on "The Origin of Man and on the Evolution of Human Food Habits," a summary which is of considerable interest and value.

Not the least useful section of the whole book is the series of plates at the end, illustrating very clearly face types of the various present human groupings. They are not only well selected but are excellently reproduced.

The whole book is well produced and is deserving of careful study, although it would provide a very difficult task for the reader who is not a student of anthropology to satisfy himself with regard to the multitude of references and quotations given. G. R. S.

"Accounts Rendered of Work Done and Things Seen." By J. Y. BUCHANAN, M.A., F.R.S. Cambridge: University Press, 1919. 21/- net.

WITH a feeling of the pleasant and easy perusal of a subject which ordinarily is made to lend itself more to deep thinking and close reasoning than to reading as generally pursued, and with reward in the form of added knowledge, we lay down this volume of some 435 pages,—and a model index.

It is a record of "work done and things seen at different times, in different places and on different subjects." The author was one of that band of eminent scientists sent out by the British Government in the *Challenger* expedition of 1872 to seek and garner knowledge of the geography of the great oceans, knowledge which up to that time was literally superficial, which told us something of the ocean surfaces, but scarce anything of the nature and physical character of the ocean beds. In fact, in the author's own words, "the science of oceanography did not exist."

J. Y. Buchanan, M.A., F.R.S., our author, was chemist and physicist on that famed and fruitful expedition, and in his book before us he gives us a collection of Papers—there are 33—embodying "A Retrospect of Oceanography in the Twenty Years before 1895" (in Paper No. 2). This retrospect, dating from the genesis of oceanography, conveys to the general reader a concise and illuminating record of much of the work of this pioneer expedition. That it comes from the pen of Mr. Buchanan himself stamps it at once with a significance and value beyond compare. Much of the book, the greater part, is a record of the fruition of the author's scientific researches in different parts of the world since.

There are also subjects without the range of oceanography, but the title of his work allows of elasticity of content. Furthermore, these remoter subjects, few though they be, may, we think, prove of perhaps even greater interest to the general reader; at the same time they possess a distinct value for the scientifically-disposed seeker after knowledge.

Mr. Buchanan has the happy gift of presenting his information so transparently that while both scientist and general reader may, equally, drink in deep and vivifying draughts of knowledge, neither may grumble at any slight or occasional disadvantage which might happen to result from the fusion of two diametrically opposite means of assimilation.

Oceanography is one of the younger sciences, known only, as Mr. Buchanan has told us, since the return of the *Challenger* in 1876. If we recall correctly, and we remark in passing, about half a hundred voluminous scientific reports resulted from that expedition, evidence of itself, were it needed, of the magnitude of the undertaking. Since that day oceanographic research has been continued untiringly. To the Prince of Monaco, perhaps more than to any other person, or even assemblage of persons, it owes its advancement. And if progress has not in its every aspect been rapid, at least it has, unquestionably, been determined, vigorous, definite, systematic, and profoundly scientific. The extent of his labours is even yet not half well enough known. Our author, we would remark, does yeoman service in focussing attention on the work of His Serene Highness. Strange would it seem at first sight that the Principality of Monaco, which little more than half a century ago was a barren rock and well nigh bankrupt, which in area, now as then, is but about three miles by half a mile, should have contributed, through, and by the personal work of, its Prince, so enormously and fundamentally, so handsomely, to the science of oceanography, to the unfolding of the story of the deep.

To return to our author. We feel we may do him greater service, and we interpret it to be more his objective on this occasion, if we adopt, for the nonce at any rate, the point of view of the general reader, for his Papers, with perhaps some few exceptions, have been read before the scientific and learned societies, and printed in our leading scientific journals. Therefore, that our influence may be used in the fullest measure, let us add that from the author's pen is here to be found, in addition to the valuable results of his life's work which we have but briefly referred to, sound discourse upon such generally interesting subjects, among others, as "The Colour of the Sea," "Sunsets of Autumn observed at Sea," "Lakes," "The Mediterranean Sea," "The Windings of Rivers," "Fish and Drought," "The Wreck of Santos Dumont No. 6 at Monaco in 1902." Each subject is treated with scientific erudition as well as being made intelligible and informative in a general sense. When, as nowadays, there is much to do in little time, much to read and little opportunity to assimilate as should be, it gives us unrestricted pleasure to bring to notice this valuable contribution to geography and its sciences.

W. H. W.

"The Study of the Weather." By E. H. Chapman, M.A., B.Sc., F.R.Met.S. Maps and Illustrations. Cambridge University Press, 1919. 3/- net.

Introduction to this latest of the Cambridge Nature Study Series tells us it is primarily a school book, and expresses the hope that it will be acceptable as an introduction to the study of modern meteorology. Appraising these objectives as we most certainly do, we welcome its advent from a quite different point of view. In the home, the weather-glass has become nearly as much a necessary household effect as is the clock; but its use is more ornamental and presence more customary than it is practical. By movement of itself, or facial inducement, the weather-glass, or barometer, would tell us what with equal or greater certainty we should be able to foresee ourselves—would, in point of fact, tell us (sometimes!) what weather we might expect—in short, would think for us! Does he of the countryside depend upon its "brain" waves? Is not to ask the question to answer it? His innate, almost unconscious, study, his hourly outlook through the days and years, have given him to know with far greater sureness what he may expect. Perhaps the town dweller's arcades and shelters have caused him to have little concern with weathers-to-be. But his opportunities, had he so willed, have been no less than his kinsman afield. 'Twixt home and business he might have become well-nigh as proficient. He has no doubt read, perhaps re-read, those Ruskin cloud studies, studies which make one love the sky as much as, perhaps more than, the landscape. Be he photographer, his ambition may have led him into effort to secure those entrancing effects in his pictures. He has, too, seen the fog and the mist, the dew, the frost and the hoar frost, a thousand times and more; but has he known, or if knowing may he not have forgotten whence they came and why? The prelude to a knowledge of all these and a hundred other points in nature, in effect to their scientific study, is to be found through the pages of the book under notice. If he but read it his knowledge will increase manyfold—he will better appreciate his Ruskin—the value of photography to him will be enhanced—his barometer will become yet more ornamental—the countryside will come to his door. But greatest of all its benefits, his percipient faculty, pigeon-holed or may be unrealised, will be awakened and inspired; and who knows how far such a mental revivification may lead him on! Nowadays the pen disseminates knowledge wildly. We scarce know the way to take best to benefit the mind. We may suffer from mental indigestion, no less from varying quality than mass of matter. We read, but perhaps do not assimilate. If we be frank we are bound to say there are subjects of everyday life which, if ever known, have become dim. Therefore it is good to have available a presentation, as this work, so concise yet ample, so direct and forceful: born of itself for itself. To those who would go beyond mere reading—and should we not all be students to the end?—the book tells how for ourselves we may appreciate and record the happenings of the weather; and more. The benefit is many-sided, and may be made far-reaching. Whatever the existing knowledge it will refresh it. It will at least consolidate it. It may even add to it. And its reading will occupy scarce more time than is given to one's daily paper.

W. H. W.

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"Petrology for Students." By Alfred Harker, M.S., LL.D., F.R.S., F.G.S. Cambridge: University Press. 8/6 net. 300 pp.

No pathologist has done more for the college student than Dr. Harker, and this edition of his petrology for students is as welcome as its predecessors. The diagrams are well drawn and well produced. It would be an advantage from the young students' standpoint if letters were used to indicate the main features of a mineral peculiar to some particular rock section, as is done, for example, on page 130, fig. 45. It is good that the author has retained the British idea of the simple grouping for volcanic rocks rather than the continental system.

The book is attractive in its style, as is to be expected from Cambridge University Press. T. W. F. P.

# Proceedings of the Society.*

## January 1st to December 31st 1919.

The 1,087th Meeting of the Society was held on Tuesday, January 7th, 1919, at 7.0 p.m. Colonel H. T. Crook, D.L., V.D., presided.

The Chairman mentioned the death of Mr. Charles Pilkington, J.P., and a resolution of sympathy with his relations was passed by all rising in silence.

The election was announced of the following members: Ordinary: Mr. H. Agar, Persian Consul; Messrs. Rickett and Turner, of Herbert Whitworth, Ltd., and Miss M. H. Brown; Associate: Miss Guest.

Lieut. L. Righyni, of the Ligue Patriotique des Alsaciens-Lorrains, gave a lecture on "The Problems of Alsace-Lorraine." After speaking for an hour on the history and present position of Alsace and Lorraine, with references of a personal character, both of a humorous and pathetic character, he described a large number of interesting lantern views.

On the motion of the Chairman, a hearty vote of thanks was passed to the Lecturer, and to the League for the gift for distribution among those present of some 300 pamphlets on various aspects of the subject and 300 picture postcards.

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The 1,088th Meeting of the Society was held on Tuesday, January 14th, 1919, at 7.0 p.m. Mr. J. E. Balmer, F.R.G.S., presided.

The election of the following members was announced: Life: Mr. F. Walter Roberts; Ordinary: Miss Dodson, Miss F. M. Little, and Dr. C. Barrie Taylor; Associate: Miss F. Bailey.

Mr. J. Ernest Phythian gave a lecture on "Venice: the Sea-Girt City, and illustrated his remarks with a large number of lantern views, including maps.

A hearty vote of thanks was accorded the lecturer.

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The 1,089th Meeting of the Society was held on Friday, January 17th, 1919, at 3.30 p.m. Mr. E. W. Mellor, J.P., F.R.G.S., presided.

Miss Sophie Nicholls, M.A., F.R.G.S., gave a lecture on "In the Track of Allenby's Army," and illustrated her remarks with a large number of slides, many coloured, concluding with some natural colour slides.

On the motion of Mr. K. Jebara, the Honorary Secretary of the Manchester Syrian Relief Fund, who gave some particulars of the operations of the Fund, incidentally noting that it was formed prior to the National Fund. Seconded by the Chairman, a cordial vote of thanks was accorded to Miss Nicholls.

The 1,090th Meeting of the Society was held on Tuesday, January 21st, at 7.0 p.m. Mr. T. W. F. Parkinson, M.Sc., F.G.S., presided.

Miss Sophie Nicholls, M.A., F.R.G.S., gave a lecture on "Palestine in Peace and War, with Special Reference to the Geographical Factor in the Study of its Past and Present History." The address was illustrated with a large number of lantern slides, mainly views from her own photographs, and also many clear map-slides which she had had specially prepared, concluding with autochromes taken by her in Palestine.

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* The Meetings of the Society were held in the Geographical Hall unless otherwise stated.

A hearty vote of thanks was passed to Miss Nicholls.

The 1,091st Meeting of the Society was held on Tuesday, January 28th, 1919, at 7.0 p.m. Mr. George Ginger presided.

The Chairman mentioned the loss by death of Mr. F. G. Goodbehere, a Member for over 30 years, and said that Mr. S. H. Brooks, J.P., F.R.G.S., had kindly consented to represent the Society at the funeral. A resolution of sympathy with Mr. Goodbehere's relatives was passed.

The Chairman announced the election of the following Ordinary Members: Messrs. H. Bayfield, F. Heinrich, Arthur Humphreys, E. Swithenbank, J.P., R. Thomas, and Arthur Wood.

Mr. Henry Crowther, F.R.M.S., Curator of Leeds Museum, gave a lecture on "With Arabs and Moors in North Africa." Synopsis:—A Tunisian Port, A French Occupation, The Position of Woman, A Railway Experience, Bedouins at Home, Country Life, A Prickly Hedgerow, The Excavations at Carthage, The Readings of a Stelé, The Algerian Sea-front, Under the Palms, A Peep in a Mosque, In Moorish Bazaars, Street Scenes in Tangier, A Goblin City, Among Snake Charmers and Fire-eaters, In the Soko and the Kasbah, A Living Page from the Arabian Nights. The lecture was illustrated with many beautifully coloured and other lantern views.

A hearty vote of thanks to Mr. Crowther was passed.

The 1,092nd Meeting of the Society was held on Tuesday, February 4th, 1919, at 7.0 p.m. Mr. J. Stephenson Reid presided.

The death was reported of Mr. T. G. Winstanley, one of the original members of the Society, and a resolution of sympathy with Mrs. Winstanley and family was duly passed.

The Rev. A. W. Fox, M.A., gave a lecture, "In the Guy Mannering Country," which was illustrated by lantern slides.

On the proposition of the Chairman, the thanks of the meeting were given to the Lecturer.

The 1,093rd Meeting of the Society was held on Tuesday, February 11th, 1919, at 7.0 p.m. Mr. R. A. Staniforth presided.

The Chairman announced the election of the following ordinary members: Miss Christine, W. Wragg, Messrs. Albert Marsden, T. E. Kitto, B.Sc., and F. W. Ball, and of Mr. Fred Bourquin as an Associate Member.

Mr. John Hilditch, M.R.A.S., F.R.G.S., lectured on "The Temples and Shrines of Japan," with lantern illustrations.

On the motion of the Chairman the Lecturer was heartily thanked.

The 1,094th Meeting of the Society was held on Friday, February 14th, 1919, at 3.30 p.m. Mr. R. A. Staniforth presided, and referred sympathetically to the death of the Secretary which occurred on the previous day.

Alderman J. R. Ragdale, J.P., delivered a lecture on "The History and Associations of the North American Indians," illustrated by lantern slides.

A vote of thanks was passed to the Lecturer.

The 1,095th Meeting of the Society held on Tuesday, February 18th. 1919, at 7.0 p.m. Mr. T. W. F. Parkinson, M.Sc., F.G.S., presided.

The Chairman announced the death of the Secretary (Mr. Harry Sowerbutts), which took place on February 13th, and proposed a message of sympathy and condolence with the widow and other members of the family, which was sympathetically seconded by Colonel H. T. Crook, D.L., V.D., feelingly supported by Mr. J. Stephenson Reid, and unanimously agreed to.

Professor P. M. Roxby, B.A., F.R.G.S., delivered a lecture on "The Indian Deccan; or South India," with lantern illustrations.

A hearty vote of thanks to the Lecturer was passed.

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The 1,096th Meeting of the Society held on Tuesday February 25th, 1919, at 7.0 p.m. Mr. R. A. Staniforth presided.

The Chairman announced that the Council had appointed as Secretary Mr. T. W. Sowerbutts, F.S.A.A., in succession to his brother, Mr. Harry Sowerbutts, A.R.C.Sc., deceased.

The election as an Ordinary Member of Mr. Ernest Mumford was announced.

Mr. J. Herbert Cooke gave a lecture on "Round and about Greater New York."

The thanks of the meeting were given to the Lecturer.

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The 1,097th Meeting of the Society was held on Tuesday, March 4th, 1919, at 7.0 p.m. Mr. J. Stephenson Reid presided.

The death of Mr. Ernest Frank, a member since 1888, was noted with regret.

Miss L. Edna Walter, M.B.E., H.M.I., B.Sc., delivered a lecture: "The Fascination of Belgium," illustrated by a fine collection of lantern slides.

A hearty vote of thanks was passed to the Lecturer.

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The 1,098th Meeting of the Society was held on Tuesday, March 11th, 1919, at 7.0 p.m. Mr. George Ginger presided.

Mr. J. G. Birkby, M.A., lectured on "Awheel in Northern France before the War," with lantern illustrations.

On the proposition of the Chairman, a hearty vote of thanks was given to the Lecturer.

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The 1,099th Meeting of the Society was held on Tuesday, March 18th, 1919, at 7.0 p.m. Mr. E. W. Mellor, J.P., F.R.G.S., presided.

Mr. R. A. Staniforth gave a lecture on "Canada: its Progress and Development from Confederation," illustrated by numerous lantern slides.

The Lecturer was heartily thanked.

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The 1,100th Meeting of the Society held on Friday, March 21st, 1919, at 3.30 p.m. Mr. R. A. Staniforth presided.

In consequence of the absence of Professor P. M. Roxby, B.A., F.R.G.S., on the Board of Education Commission, his lecture on China was unavoidably postponed, and Mr. T. A. Edwards, F.R.G.S., delivered a lecture on "Progress of South Africa under the Union."

The Lecturer was thanked for his services so freely given at short notice.

The 1,101st Meeting of the Society held on Tuesday, March 25th, 1919, at 7.0 p.m. Colonel H. T. Crook, D.L., V.D., presided.

The Chairman, in congratulating the members of the successful termination of the lecture season, remarked that the only departure from the programme had been that of March 21st, when Mr. Edwards so willingly came to our assistance.

The death of Mr. Robert Huntbach was noted with regret.

Mr. Ewin Pickstone gave a lecture on "Cycling in Lakeland," with a fine collection of lantern slides made from his own photographs.

A hearty vote of thanks to the Lecturer terminated the proceedings.

## ANNUAL MEETING.

The 34th Annual Meeting of the Society was held, by kind permission, in the Lord Mayor's Parlour, Town Hall, on Friday, May 23rd, 1919, at 3 o'clock p.m.

The Right Hon. the Lord Mayor (Alderman William Kay, J.P.) presided, and was supported by Mr. Harry Nuttall, J.P., F.R.G.S., President of the Society, and Mr. E. W. Mellor, J.P., F.R.G.S., Vice-Chairman of the Council. There were also present Messrs. G. Ginger, M. Grainger, Rev. — Grime, J. Howard Hall, W. Harper, — Haworth, — Hudson (Eccles Co-op. Society), N. Jepson, Richard Kay, F.R.G.S., Mrs. F. Lambert, Messrs. F. B. Osborne, M.A., T. W. F. Parkinson, M.Sc., F.G.S., E. Pickstone, Mrs. Stordy, Mr. W. H. Ward, Rev. H. Wild, Mrs. Wilkinson, and T. W. Sowerbutts, F.S.A.A. (Secretary).

Apologies were received from the Vice-Chancellor of the University, Messrs. C. A. Clarke, T. A. Edwards, F.R.G.S., T. Gregory, F.C.A., D. A. Little (Hon. Treasurer), and George Thomas, J.P.

The Minutes of the 33rd Annual Meeting were taken as read and approved.

The Annual Report and Balance Sheet for 1918 were submitted, as follows :—

## REPORT OF THE COUNCIL

### For the Year ended December 31st, 1918.

The Council have again the pleasure to report that the activities of the Society have not been diminished by the adverse circumstances arising from war conditions.

The attendance at the weekly Tuesday evening Meetings has been well maintained. The experiment of a monthly Friday afternoon Meeting has been fully justified by the numbers present, and has been much appreciated by those members who find it inconvenient to attend the evening meetings.

The lectures delivered have been of a varied and instructive character, and it is a source of regret to the Council, that financial considerations prevent the reproduction of a greater number of the papers in the Journal. The four addresses in the following list, marked with an asterisk, are printed in the Volume for 1918, No. XXXIV:—

"The Shaping of the Coast of Britain." Mr. Henry Crowther, F.R.M.S.
"Cathedrals and Abbeys 'twixt Mersey and Thames." Rev. J. H. Burkitt.
"Across Northern England on Foot." Mr. Arnold Williams, A.C.A.
"Clough, Moor and Fell." Rev. A. W. Fox, M.A.
"Rambling Awheel." Mr. Ewin Pickstone.
"By Train to the Land of the Midnight Sun." Mr. W. Sanderson, J.P.
"Unknown France." Mr. Samuel Wells, F.R.G.S.
"The Political and Social Conditions of Spain." Rt. Rev. Monsignor Kelly.
"Italy Divided, United, Unredeemed." Mr. J. Ernest Phythian.
"Tusculum and its Surroundings." Rev. H. Morrisey, M.A.
"A Holiday in Greece." Mr. J. L. Paton, M.A.
"The Outgoing Turk : Turkey Yesterday and To-day." Mr. Samuel Wells, F.R.G.S.
"From the Persian Gulf to the Yenesei." Prof. G. Elliot Smith, F.R.S.
*"Glimpses of Russian Turkestan." Mr. Wm. Stern.
"Journeys in Persia." Lieut. W. Leonard Flinn.
"Manchuria and Korea." Prof. P. M. Roxby, F.R.G.S.
"Climate and Character in India." Rt. Rev. Bishop Welldon, D.D.
"Rajputana." Mr. E. W. Mellor, J.P., F.R.G.S., F.R.P.S.
"Southern Rhodesia : A White Man's Country." Mr. T. A. Edwards, F.R.G.S
"A Cruise to the Azores, Canary Islands, and Madeira, with Calls on the Way." Mr. N. Jepson.
*"The Remote Bermudas." Mr. J. Herbert Cooke.
"Mexico and the Mexicans." Mr. A. E. Collyer.
"Haunts and Legends of the Red Indians." Alderman J. R. Ragdale, J.P.
*"British Cartography during the War." Colonel H. T. Crook, D.L., V.D.
"Glaciers and their Work." Miss L. Edna Walter, M.B.E., H.M.I.
*"Mythology and Mankind." Miss Kate Qualtrough, F.R.G.S.
"Astronomical Models illustrating the Motions of the Sun, Earth, and Moon." Mr. Wm. Wilson, M.B., C.M., F.R.A.S.

The Journal for 1917 (Volume XXXIII) has been issued during the year in one number as it has not yet been possible to resume the quarterly publication.

The Library and Map Collection has been enriched during the year as will be seen by the lists of Books, Maps and Exchanges given in the Journal. Special attention is called to the valuable collection of Maps received from the General Staff of the War Office (Geographical Section), comprising the whole of the series of maps issued during the War, and which were exhibited to the members in October last when Colonel H. T. Crook, D.L., V.D., gave a most valuable and interesting resumé of the work done and explanation of the maps exhibited.

It is gratifying to the Council to find that each year more use is being made by the members of the 8,000 books in the Library, in addition to periodicals. Over 300 volumes have been taken out during the year.

The thanks of the Council are tendered to the Victorians for their services in the delivery of lectures during the year.

The Council deeply regret the loss by death of the following members:—

Mr. W. J. Dean.
Major P. K. Glazebrook, M.P. (Killed in action).
Mr. J. H. Greenhow.
Mr. Robert Guest.
Mr. F. M. Hurst.
Mr. Peter Knowles.
Mr. E. Makin.
Mr. G. W. Nichols.
Mr. Charles Pilkington, J.P.
Mr. H. C. Pingstone.
Mr. A. C. Russell.
Mrs. M. B. Smith.
Mr. R. Stewart.
Mr. J. J. Wilde.
Mr. T. Fewster Wilkinson.
Mr. G. S. Woolley.

Messrs. E. Makin, H. C. Pingstone and G. S. Woolley were original members.

The Council deeply sympathise with those members who have suffered bereavement by the death of their relatives in the War.

The following Members of the Society are now serving or have served in His Majesty's Forces:—

Colonel John Ainsworth, C.M.G. D.S.O.
Colonel E. W. Greg, J.P., C.C., F.R.G.S.
Colonel S. L. Mandleberg, J.P.
Lieut.-Col. M. Gamble, R.A.M.C., M.D.
Major A. England, R.A.
Major P. K. Glazebrook, M.P. (Killed in Action).
Major E. Johnson, J.P.
Major E. Keith Roach.
Capt. W. Morton Johnson, F.R.G.S. (Killed in Action).
Captain L. E. Mather, F.R.G.S.
Captain G. R. Mellor, M.C.
Captain Wm. Robinow, M.C.
Captain R. W. Swallow, B.Sc.
Captain Norman Zimmern, M.C.
Lieut. W. L. Flinn.
Lieut. C. V. Groves, R.N.
Lieut. G. R. Swaine.
Sub-Lieut. H. C. Handcock, R.N.R.
Staff-Sergt. H. Shorrocks.
Dr. Edgar Grey.
Mr. W. S. Ascoli, F.R.G.S.
Mr. H. S. Beck.
Mr. F. Clay.
Mr. H. Green, M.A.
Mr. Harry Herd (died during training).
Mr. Arthur Holt.
Mr. B. Jordan.
Mr. E. Lightowler.
Mr. Wm. R. Shaw.
Mr. T. H. B. Sowerbutts.
Mr. Charles Sutton.
Mr. Arnold Williams, A.C.A.
Mr. A. W. Wood.
Mr. W. D. Woods.

The Council will be pleased to receive intimation of any omissions from this list.

The Society has lost the valued and active assistance of The Rt. Rev. Bishop Welldon, D.D., in consequence of his appointment to the Deanery of Durham, and the Council desire to place on record their high appreciation of his great services, not only to this Society, but also to the cause of Geographical Education in general.

The Council also regret to have to report that Mr. Theodore Gregory, F.C.A., who has rendered valuable service as Honorary Auditor from the foundation of the Society, a period of 34 years, now feels that the time is come for him to retire. They feel sure the members of the Society will join with them in expressing their high appreciation of the services so freely rendered for such a long period, and trust he may live for many years to enjoy his well-earned repose.

The Balance Sheet for 1918, with the certificate of the Honorary Auditor, is appended.

A reference to the Revenue Account will show a further deficit on the year, which, added to those for 1916 and 1917, makes a total for the three years of *£177 15s. 1d.* The Council made an appeal to the members for donations to liquidate this adverse balance, which resulted, up to December 31, 1918, in the sum of *£152 18s. 6d.* being subscribed, as shown in the list appended to the Accounts. As there will be a further sum required for 1919, in addition to the cost of the decoration of the premises, much overdue, the list has been kept open so that those members who have not yet subscribed may have the opportunity of doing so.

The number of members before the war reached 721, but on December 31st, 1918, was 631, being a net decrease of 3 during the year. The assistance of the members is particularly requested so that the number may be not only restored to its pre-war standard, but increased, in order to enable the work of the Society to be continued and extended.

Although occurring after the close of the year, the Council cannot allow this opportunity to pass without placing on record an expression of their deep sorrow on the early death of the late Secretary, Mr. Harry Sowerbutts, A.R.C.Sc., who passed away after a brief illness on February 13th, 1919, at the age of 51 years. He was no ordinary servant of the Society. He inherited his father's zeal and devotion to the cause of Geography, and it is no exaggeration to say that he has sacrificed himself in this cause. During the last fifteen years he devoted himself with wholehearted zeal to the welfare of the Manchester Geographical Society.

## BALANCE SHEET, DECEMBER 31st, 1918.

| LIABILITIES. | | £ s. d. |
|---|---|---|
| To Sundry Creditors ... ... ... ... ... ... | | 70 11 10 |
| ,, Subscriptions Paid in Advance :— | | |
| Ordinary Members ... ... ... | £33 12 0 | |
| Associate ,, ... ... ... | 17 17 0 | |
| | | 51 9 0 |
| ,, Life Membership Reserve Account ... ... ... | | 241 10 0 |
| ,, Kirkpatrick Endowment Fund ... ... ... ... | | 50 0 0 |
| ,, Eli and Emma Sowerbutts Memorial Fund ... ... | | 150 0 0 |
| ,, John Walkden Memorial Fund : Balance Unexpended | | 6 6 0 |
| ,, Investment Depreciation Account ... ... .. | | 451 11 4 |
| ,, Balance :— | | |
| From last Account ... ... ... | £355 2 7 | |
| Add Donations—see List ... ... | 152 18 6 | |
| | £508 1 1 | |
| Less Deficit Revenue Account, 1918 ... | £108 19 10 | |
| | | 399 1 3 |
| | | £1,420 9 5 |

| ASSETS. | | £ s. d. |
|---|---|---|
| By 172 Shares of £10 each fully paid in M.G.S.B. Co., Ld. | | |
| 62 Purchased ... ... ... ... | £211 11 4 | |
| 110 Presented ... ... ... ... | 1,100 0 0 | |
| | | 1,311 11 4 |
| ,, Subscriptions in Arrear :— | | |
| Ordinary Members ... ... ... | £13 13 0 | |
| Associate ,, ... ... ... | 1 1 0 | |
| | | 14 14 0 |
| ,, Cash in Bank ... ... ... ... ... | £85 18 4 | |
| ,, Cash in Hand ... ... ... ... ... | 8 5 9 | |
| | | 94 4 1 |
| | | £1,420 9 5 |

### AUDITOR'S CERTIFICATE.

I have audited the above Balance Sheet, and certify its correctness. I have also examined the Certificates for the Shares in the Building Company and found them in Order.

THEODORE GREGORY, F.C.A.,
*Hon. Auditor.*

**17th** April, 1919.

# REVENUE ACCOUNT.

## YEAR ENDING DECEMBER 31st, 1918.

*Dr.*

| 1918. | | | £ | s. | d. |
|---|---|---|---|---|---|
| Decr. 31. | To Expenses of Meetings ... ... ... | | 120 | 1 | 8 |
| | ,, Journal, Vol. XXXIII, *less* Sales and Advertisements ... ... ... ... | | 44 | 5 | 4 |
| | ,, Rent, Lighting and Insurance ... ... | | 147 | 17 | 8 |
| | ,, Salaries ... ... ... ... ... | | 130 | 10 | 0 |
| | ,, Wages ... ... ... ... | £93 10 6 | | | |
| | ,, Sundry Expenses ... ... | 22 9 5 | | | |
| | | | 115 | 19 | 11 |
| | ,, Commission and Expenses—New Members and Collection of Subscriptions ... ... | | 13 | 1 | 9 |
| | ,, Books, Maps, Binding, &c., Library ... | | 3 | 11 | 6 |
| | ,, Education Committee ... ... ... | | 1 | 3 | 3 |
| | | | £576 | 11 | 1 |

*Cr.*

| 1918. | | | £ | s. | d. |
|---|---|---|---|---|---|
| Decr. 31. | By Members' Subscriptions :— | | | | |
| | Life Members (Transferred to Balance Sheet) ... | £31 10 0 | | | |
| | Ordinary Members ... ... | £397 19 0 | | | |
| | Associate ,, ... ... | 57 15 0 | | | |
| | Affiliated Societies ... ... | 10 10 0 | | | |
| | | | 466 | 4 | 0 |
| | ,, Bank Interest ... ... ... ... | | 1 | 7 | 3 |
| | ,, Deficit on year carried to Balance Sheet ... | | 108 | 19 | 10 |
| | | | £576 | 11 | 1 |

NOTE.—The Furniture, Fittings, Books, Maps, Lantern Slides, Stock of Journals, etc., which are insured for £1,000, are not included as Assets in the Balance Sheet. There are 52 Life Members (including one Honorary), and the Subscriptons of 28 of this number have been taken as Income in years prior to 1908.

DONATIONS towards Deficiencies for 1916, 1917 and 1918, received in 1918.

| | £ | s. | d. |
|---|---|---|---|
| Armitage, G. F., J.P. | 0 | 10 | 0 |
| Arning, A. W. | 1 | 0 | 0 |
| Arnold, A. Linney | 2 | 2 | 0 |
| Ashworth, Mrs. and Miss | 0 | 5 | 0 |
| Ashworth, James | 0 | 5 | 0 |
| Ashworth, Wm., F.C.A. | 1 | 0 | 0 |
| Balmforth, A. | 0 | 10 | 0 |
| Barningham, Mrs. | 2 | 0 | 0 |
| Barningham, Thos., J.P. | 1 | 1 | 0 |
| Barnet, Mrs. L. | 0 | 5 | 0 |
| Baron, J. W., C.C., J.P. | 0 | 10 | 6 |
| Battershill, S. C. | 0 | 9 | 0 |
| Berry, G. F. | 0 | 5 | 0 |
| Bishop, J. K. | 1 | 1 | 0 |
| Blaikie, Mrs. | 0 | 5 | 0 |
| Boddington, Henry, J.P. | 1 | 0 | 0 |
| Bolivar, Mrs. A. de | 0 | 10 | 0 |
| Booth, A. H. | 0 | 10 | 0 |
| Briggs, Henry | 0 | 10 | 6 |
| Briggs, Herbert | 0 | 5 | 0 |
| Brooke, J. A. | 0 | 5 | 0 |
| Brooks, S. H., J.P., F.R.G.S. | 1 | 1 | 0 |
| Brooks, Mrs. C. | 0 | 5 | 0 |
| Brown, Alfred | 0 | 10 | 0 |
| Brown, A. E. B. | 0 | 10 | 6 |
| Brown, Miss M. A. | 0 | 5 | 0 |
| Bruce, Miss J. A. | 0 | 5 | 0 |
| Bubb, Mrs. A. | 0 | 5 | 0 |
| Buckley, J. | 0 | 10 | 0 |
| Buckley, W. S. | 0 | 10 | 0 |
| Burgon, Anthony | 1 | 1 | 0 |
| Burke, Thomas | 0 | 5 | 0 |
| Burton, Walter | 0 | 10 | 0 |
| Campbell, B. | 0 | 10 | 0 |
| Carver, W. O. | 2 | 2 | 0 |
| Charnock, Mrs. | 0 | 5 | 0 |
| Chorlton, Isaac | 0 | 10 | 6 |
| Clapham, Thos., F.R.G.S. | 0 | 10 | 0 |
| Clarke, C. A. | 1 | 1 | 0 |
| Collman, C. | 0 | 5 | 0 |
| Cooke, J. Herbert | 0 | 10 | 6 |
| Coppock, Miss Annie | 1 | 0 | 0 |
| Crewdson, Alfred | 5 | 0 | 0 |
| Crompton, Mrs. | 0 | 5 | 0 |
| Crossland, Robt. F., J.P. | 0 | 5 | 0 |
| Dawkins, Prof. W. Boyd, J.P., M.A., F.R.S. | 1 | 0 | 0 |
| Dickson, E. H. L. | 0 | 10 | 0 |
| Draper, W. Turner | 2 | 2 | 0 |
| Duckworth, Charles | 1 | 0 | 0 |
| Dyckhoff, C. | 1 | 0 | 0 |
| Edwards, T. A., F.R.G.S. | 1 | 1 | 0 |
| Edwards, Mrs. T. A. | 1 | 1 | 0 |
| Egerton of Tatton, Rt. Hon. Earl | 1 | 0 | 0 |
| Evans, E. Roose | 0 | 5 | 0 |
| Evans, E. Russell | 0 | 5 | 0 |
| Evans, J. H. | 0 | 5 | 0 |
| Evans, L. C. | 0 | 10 | 6 |
| Ferguson, W. | 0 | 10 | 0 |
| Follows, F. W. | 0 | 10 | 6 |
| Forsyth, Henry | 0 | 10 | 0 |
| Frank, Ernest | 0 | 10 | 0 |
| Garner, C. T. I. | 0 | 2 | 6 |
| Ginger, George | 0 | 10 | 0 |
| Glossop, J. P. B. | 2 | 0 | 0 |
| Godlee, Francis | 3 | 3 | 0 |
| Goodwin, J. W. | 0 | 5 | 0 |
| Graham, Miss J. | 0 | 5 | 0 |
| Greenough, Richard | 1 | 1 | 0 |
| Gregory, J. | 0 | 5 | 0 |
| Groves, W. G. | 1 | 1 | 0 |
| Güterbock, A. | 0 | 5 | 0 |
| Haerem, C. V. | 0 | 10 | 6 |
| Hall, J. Howard | 0 | 10 | 0 |
| Hall, Mrs. J. Howard | 0 | 10 | 0 |
| Hancock, J. | 0 | 10 | 0 |
| Hanlon, Rt. Rev. Bishop | 1 | 0 | 0 |
| Hargreaves, George | 0 | 10 | 6 |
| Harlow, C. | 0 | 5 | 0 |
| Haylock, Miss J. P. | 0 | 5 | 0 |
| Heyes, John, J.P. | 0 | 10 | 0 |
| Higgins, John H. | 0 | 5 | 0 |
| Higham, J. S., M.P. | 1 | 0 | 0 |
| Hilton, Thomas | 0 | 5 | 0 |
| Hilton, Mrs. Thos. | 0 | 5 | 0 |
| Hindle, James, L.R.A.M., and Mrs. Hindle | 0 | 10 | 0 |
| Hirst, Alfred, J.P. | 1 | 1 | 0 |
| Hockin, C. Owen | 0 | 5 | 0 |

| | £ | s. | d. |
|---|---|---|---|
| Hodgson, Wm. | 1 | 1 | 0 |
| Holden, Henry | 5 | 0 | 0 |
| Holt, Miss | 0 | 5 | 0 |
| Hoole, Mrs. | 0 | 5 | 0 |
| Hoole, O. | 0 | 5 | 0 |
| Horsfall, T. C. | 0 | 10 | 0 |
| Houghton, J. | 1 | 0 | 0 |
| Hoyle, W. E., M.A. | 0 | 10 | 0 |
| Hulme, C. J. | 0 | 10 | 6 |
| Jackson, Miss A. R. | 0 | 5 | 0 |
| Jacobson, T. Owen, M.P. | 0 | 10 | 0 |
| Jefferson, A. H. | 0 | 10 | 0 |
| Jenkins, Ald. T. H. | 0 | 10 | 0 |
| Johnstone, C. A. | 0 | 5 | 0 |
| Jones, Wm. | 0 | 5 | 0 |
| Kay, Richard, F.R.G.S. | 5 | 0 | 0 |
| Kelly, Rt. Rev. Monsignor | 0 | 5 | 0 |
| Kessler, P. W. | 1 | 0 | 0 |
| Kiesling, A. E. | 0 | 5 | 0 |
| Kinch, W. S. | 0 | 10 | 0 |
| Knudson, A. | 0 | 10 | 0 |
| Kukla, Chas. | 0 | 10 | 0 |
| Lancaster, James, J.P. | 0 | 10 | 0 |
| Law, Miss A. E. | 0 | 5 | 0 |
| Leah, S. P. | 0 | 10 | 6 |
| Lees, Mrs. H. L., F.R.G.S., A.R.C.I. | 1 | 0 | 0 |
| Lees, Walter | 0 | 10 | 0 |
| Lindsay, G. | 0 | 5 | 0 |
| Little, David A. | 1 | 0 | 0 |
| Livesey, Miss G. E. | 0 | 5 | 0 |
| Longden, A. W. | 0 | 10 | 0 |
| McDougall, Charles | 0 | 5 | 0 |
| McDougall, Robert | 2 | 2 | 0 |
| Mandleberg, Sir G. C., J.P. | 0 | 10 | 0 |
| Mandleberg, Col. S. L., J.P. | 0 | 5 | 0 |
| Marsden, Mr. and Mrs. J. | 4 | 0 | 0 |
| Martin, R. | 0 | 5 | 0 |
| Martin, H. C., F.R.G.S. | 0 | 5 | 0 |
| Marx, Charles | 1 | 1 | 0 |
| Massey, Harold F. | 1 | 0 | 0 |
| Massey, Leonard F. | 0 | 5 | 0 |
| McFarlane, H. H. | 0 | 10 | 0 |
| Medlyn, W. J. | 0 | 5 | 0 |
| Melland, E. | 1 | 0 | 0 |
| Mills, A. | 0 | 5 | 0 |
| Morreau, M. | 0 | 5 | 0 |
| Morrisey, Rev. Hugh, M.A. | 0 | 10 | 6 |
| Mort, Miss G. E. | 0 | 5 | 0 |
| Nanson, Miss W. M. | 0 | 5 | 0 |
| Nichol, W. | 0 | 5 | 0 |
| Neil, Alex. | 1 | 0 | 0 |
| Neild, Jesse | 0 | 10 | 0 |
| Nuttall, Harry, F.R.G.S. | 0 | 10 | 6 |
| Nuttall, Mrs. H. | 0 | 10 | 6 |
| Nuttall, R. W. | 0 | 5 | 0 |
| Nuttall, Mrs. R. W. | 0 | 5 | 0 |
| Openshaw, Miss E. N. | 0 | 5 | 0 |
| Osborne, F. B., M.A. | 0 | 5 | 0 |
| Parkinson, T. W. F., M.Sc., F.G.S. | 0 | 5 | 0 |
| Peters, Miss S. Kate, & Sister | 0 | 10 | 0 |
| Philips, Miss | 1 | 0 | 0 |
| Phythian, J. Ernest | 0 | 10 | 0 |
| Pickstone, E. | 1 | 1 | 0 |
| Pilkington, L. | 1 | 1 | 0 |
| Potts, Mrs. H. A. | 0 | 5 | 0 |
| Prussman, R. | 0 | 5 | 0 |
| Putz, F. R. | 0 | 10 | 6 |
| Qualtrough, Miss K., F.R.G.S. | 1 | 1 | 0 |
| Reade, C. E. | 2 | 2 | 0 |
| Reid, J. Stephenson | 0 | 10 | 6 |
| Renshaw, Miss R. J. | 0 | 5 | 0 |
| Richardson, Miss M. | 0 | 10 | 0 |
| Robertshaw, James | 1 | 0 | 0 |
| Robertson, W. J. | 1 | 0 | 0 |
| Robinson, Miss | 0 | 10 | 0 |
| Salford, Rt. Rev. Bishop of | 0 | 6 | 0 |
| Scott, Walter | 0 | 5 | 0 |
| Seddon, Mrs. | 0 | 5 | 0 |
| Shaw, W. R. | 0 | 5 | 0 |
| Shepherd, Coun. R. W. | 0 | 5 | 0 |
| Sheppard, E. F. | 0 | 10 | 0 |
| Smith, Rev. F. C., M.A., F.R.G.S. | 0 | 10 | 0 |
| Smith, James | 0 | 5 | 0 |
| Smith, S. | 0 | 5 | 0 |
| Smith, T. M. | 1 | 0 | 0 |
| Sowerbutts, T. W., F.S.A.A. | 0 | 5 | 0 |
| Spencer, Miss M. R. | 0 | 5 | 0 |
| Spencer, S. | 0 | 5 | 0 |
| Sprott, W. J., M.D., M.R.C.S. | 0 | 5 | 0 |
| Staniforth, Harry | 0 | 5 | 0 |
| Staniforth, R. A. | 3 | 0 | 0 |
| Staniforth, Mrs. R. A. | 1 | 0 | 0 |
| Staniforth, Miss | 1 | 0 | 0 |

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| Steinthal, Egbert | 0 | 10 | 0 |
| Sternberg, S. | 0 | 5 | 0 |
| Stevenson, John | 0 | 10 | 0 |
| Stonehewer, W. | 1 | 1 | 0 |
| Stordy, Mrs. | 1 | 0 | 0 |
| Tatham, Mrs. N. | 0 | 10 | 6 |
| Taylor, Miss | 0 | 5 | 0 |
| Taylor, Miss A. I. | 0 | 5 | 0 |
| Taylor, Walter | 0 | 5 | 0 |
| Thomas, George, J.P. | 1 | 0 | 0 |
| Thompson, Robert | 0 | 10 | 0 |
| Thorpe, Walter | 0 | 5 | 0 |
| Tinker, Miss | 0 | 10 | 0 |
| Wainwright, T. F., J.P. | 0 | 10 | 0 |
| Walch, Mrs. W. E. | 0 | 5 | 0 |
| Walker, Frank | 0 | 5 | 0 |
| Walker, John | 0 | 5 | 0 |
| Walker, Miss M. S. | 0 | 5 | 0 |
| Walter, Miss L. Edna, M.B.E., H.M.I. | 0 | 10 | 0 |
| Warburton, Miss E. E. | 0 | 5 | 0 |
| Warburton, Miss L. W. | 0 | 5 | 0 |
| Ward, W. H. | 1 | 0 | 0 |
| Warren, Geo. H. | 0 | 10 | 0 |
| Watson, Jos. | 0 | 5 | 0 |
| Webster, John | 0 | 10 | 0 |
| Welding, Miss | 0 | 5 | 0 |
| Welldon, Rt. Rev. Bishop, D.D. | 0 | 5 | 0 |
| Welsh, W. | 1 | 0 | 0 |
| " West Africa " | 2 | 0 | 0 |
| Whitby, W. H. | 2 | 0 | 0 |
| White, Mrs. M. M. | 0 | 5 | 0 |
| Whittle, H. B., B.A. | 1 | 1 | 0 |
| Whitworth, Herbert, Ltd. | 2 | 2 | 0 |
| Williams, Arnold, F.C.A. | 0 | 5 | 0 |
| Wood, Geo. H. | 0 | 5 | 0 |
| Woodhouse, J. H., F.R.I.B.A. | 0 | 5 | 0 |
| Woolfenden, J. | 1 | 0 | 0 |
| Wylde, Miss Bertha | 0 | 5 | 0 |
| Young, L. | 0 | 5 | 0 |
| Zimmern, Fritz, F.R.G.S. | 5 | 0 | 0 |
| | £152 | 18 | 6 |

The Lord Mayor remarked that he need not say how interested he was in the Society and its efforts, because to-day, especially, such intellectual societies with a highly educational value were of great importance. He moved the adoption of the report and accounts.

Mr. Harry Nuttall, J.P., F.R.G.S., the President of the Society, in seconding the motion, said:—I wish to express the sincere regret we all feel at the numerous losses we have sustained amongst our members, and also of our Secretary (Mr. Harry Sowerbutts). Three of the members who have passed away were original members—Mr. Makin, Mr. Pingstone, and Mr. G. S. Woolley. By the death of Mr. Harry Sowerbutts the Society had lost a great power, he was not only an enthusiast but a great worker, and on that work he brought to bear a considerable knowledge and ability. It would be exceedingly difficult to replace such a man; he was not found every day. I have already said he was a thorough enthusiast, always working at this particular subject as his father did before him, in furtherance of geographical studies. Our hopes are still unfulfilled about geographical education taking a more definite place in our educational system. We have been continually pressing our views—and we shall continue to express them in the hope that something of a more satisfactory character will come of them—that there should be a Chair of Geography at the Universities or a special course of studies that should entitle a student to a degree, the object being that knowledge and interest should spread from the top downwards through every part of the country.

We were in communication with Mr. Fisher during the passing of the last Education Bill. It was my duty to write to him several letters, and to make various personal representations to him. I had a good many interviews with him, and found him very sympathetic, and, I think, desirous to do a great deal of what we wish to see carried out, but the Education Office is a peculiar kind of rabbit warren; things run in grooves, and it is very difficult in their system to get a change made in the subjects taught, and in the arrangement of the curriculum of studies. We wanted geographical studies to take a more prominent place in secondary schools, and thus provide posts for men of ability, industry and education, who had previously had a university career and taken a degree in Geography. That was our aim and we hold, and always have held, that it is a question of first importance to this country to have a thorough education in Geography. We hold that it is the foundation and beginning of everything. You might as well try to sail the seas without chart or compass as not have a thorough grounding in Geography in handling the affairs of this world. The work of the world of Geography in the past year has been largely devoted to economic questions—these naturally arise out of the War—and talk about reconstruction and subjects of that kind. One does not say anything political here, but in passing, I might mention the fact which I see stated in the paper this morning that the Ministry of Reconstruction, which was established by special Bill, is to disappear, so how reconstruction is going to be handled I don't know.

But to return to the subject upon which I was speaking. The view we take is that we must have a knowledge of Geography in dealing with the world's affairs, even with local affairs, because local affairs are connected with world affairs. Turning for a moment from the world of Geography at large, I might say that our Society has, I think, done an unusually large amount of useful work during the past year. We have had most varied and instructive lectures in our Hall on Italy, Turkey, Persia, Russia, Turkestan, Manchuria, Korea, Rajputana and Spain. Of course, that means that knowledge of these countries, both of the scientific kind and bearing on commercial subjects is made available for the use of the people of this city. And the Victorians have done a good deal of useful work in the past year, giving various lectures and spreading knowledge in a very interesting manner, and for that we owe them a very considerable debt. Speaking again of the economic side of Geography to which great attention has been directed by most Geographers in the past twelve months, we find, as an example, that Mr. E. B. Stebbing gave a paper at the Royal Geographical Society, on the "Forest Regions of North-East Russia"—timber will be a very important question in the future, and that is a subject on which we naturally require information. Then Sir Alfred Sharpe gave a very interesting account of what he called "The Backbone of Africa"—the region stretching for 4,000 miles from the Southern Indian Ocean to the Mediterranean Sea. Three thousand four hundred miles of that journey can be made by water, leaving six hundred miles of land travel to be overcome in various ways, railways, or motor vehicles. However, there you have this large stretch of territory, and he calls attention, as General Smuts did (which I mentioned at our meeting a year ago), to the genial climate of many parts of it, especially about the region of Lake Nyassa and Lake Tanganyika. Products of every kind can be grown in these regions. He also refers to the cotton growing possibilities of East and West Africa, and the Soudan. That is a highly interesting question to us as commercial geographers, for it is well known that we must produce cotton in a much more prolific manner than we are doing now because consumption in the United States will ultimately overtake their own crop.

Therefore, we have to look to other regions, and there are these regions where cotton can be grown, but it requires industry and enterprise, and it requires Peace. On the question of the prolific character of the earth we now occupy Mesopotamia, where already cultivation has been developed to a considerable extent, and there is no doubt that we shall ultimately see Mesopotamia a garden such as it was in ancient times. Then we turn to Syria and Asia Minor, countries which are coming under the control apparently of England and other Powers. Asia Minor is a particularly rich country, and there again are resources for the enterprise of mankind which can be dealt with in a very different manner than they have been by Turkey. Palestine has become a very attractive problem to us. Some of us have had relations going through Palestine, and not only its Geography, but its possibilities have interested us. I see in " Palestine," which advocates a Jewish Palestine, that particular mention is made of the water power of Palestine. I suppose that must be correct, though my idea was that there was rather a scarcity of water. They describe various rivers and gullies which could develop electrical power. Of course, we know the Jordan carries a great volume of water which at certain periods of the year could be turned to electrical purposes, but I hope it won't be used for manufacture but for working tractors for agricultural use or something of that sort. But perhaps there is no great objection to manufacture if you don't have smoke.

I always thought it a pity before the War that a railway was ever built in Palestine. It was a shock to me the first time I saw an account of a railway from Jaffa to Jerusalem. I should have preferred to see an international reserve of the whole place as the most historical ground as we all believe, in the history of mankind. However, there is the railway, and I am told by my son, who was in Palestine a good part of the time until brought to France, that now you can go from Cairo to Aleppo by railway, and that a swing bridge has been built on the Suez Canal near Kantara. One hopes the railway will be of value, and that it won't bring disadvantages with it. I think I have already said, referring to the same idea, that we are especially interested in commercial geography, whilst we do not neglect the scientific side—I think we may say we give equal attention to both. But we never neglect the commercial side, and the reason is that the Society was especially founded to help the commercial life of our city. Our industries, which we so much need and shall foster, have been interrupted by the Germans in their criminal madness. They talked about the Will to Power. One of their writers, Bernhardi, cried out " World Power or Downfall," which sounds very much like Satan in Milton's " Paradise Lost," as he was depicted in his revolt against the Most High. The Will to Power has ended in Downfall. Was there ever in human affairs such hurling from a high position down into the very dust as that which Germany has richly deserved? Unfortunately, she involves the rest of the world in this sad catastrophe. Then they talked about "Der Tag," the great day when the German Fleet should destroy our Navy. The result is shown in a very striking manner in a picture by Sir Luke Fildes in this year's Academy. It is a sea piece representing majestic ironclads moving towards you, and these majestic battleships are sailing humbly across the North Sea to be interned in English ports. This is indeed "Der Tag," the downfall of their fleet with which they intended to destroy us. Never was such a scene known as that, the end of German ambition to dominate the world.

A more human and civilised creed is to have the Will to Peace, and then in brotherly unity to do battle against the forces of nature. We have seen in the course of history many years devoted to peaceful industry, then madness has seized mankind and they have turned to murder, and also destroyed the bridges, the factories, the railways, the crops—all the products of their skill and work. When the present war broke out the words of Puck in Shakespeare's "Midsummer Night's Dream" rushed into my mind. He is an immortal looking upon the pranks of some of the characters of the play, and he bursts out with "Lord, what fools these mortals be." It really is amazing that human beings should ever fall into such gigantic folly. Sir Edward Grey, when Secretary of State for Foreign Affairs, expressed amazement, before the war, at the way in which Europe was arming, and said, "We are rattling back to barbarism." We have an Armistice, but their is civil war in Russia; there are rumblings of unrest throughout the world, and one of the most difficult problems of the future is the Balkans. The present position certainly is one to cause us some apprehension, but surely the world has learnt something from this gigantic catastrophe, and if reason prevails and the League of Nations can be brought into practical operation then we may escape the doom feared by Edward Grey, and live in hope of a better future for mankind.

The resolution was carried unanimously.

The Secretary reported that the retiring officers and

Council had been duly nominated with the following additions :—

As Vice-President : Mr. Theodore Gregory, F.C.A., J.P.
On the Council : Mr. Ewin Pickstone.
As Hon. Editor : Mr. Egbert Steinthal.
As Hon. Secretaries : Messrs. Richard Kay, F.R.G.S., and
T. W. F. Parkinson, M.Sc., F.G.S.

Mr. N. Jepson proposed, the Rev. H. Wild seconded, and it was unanimously resolved : That the Officers and Council as nominated be and are hereby elected.

Mr. E. W. Mellor, J.P. F.R.G.S., proposed : That the best thanks of the Society be tendered to Mr. Theodore Gregory, F.C.A., J.P., for his services as Hon. Auditor, and that Mr. John Thomason, A.C.A., be elected Hon. Auditor for the forthcoming year, and in doing so said : Mr. Theodore Gregory, the retiring auditor, had audited the accounts of the Society since its initiation, and a well-deserved tribute had been paid to him by electing him a vice-president and an honorary member of the Society. Referring to the address delivered by the President, he felt he could not sit down without thanking him for his interesting resume.

Mr. F. B. Osborne, M.A., said he would like to emphasise what the President said as to the importance of having Chairs of Geography not only in Manchester, but all over the country. Mr. Osborne also voiced the deep sense of gratitude the members feel towards Mr. Gregory for the great work he has done for such a large number of years. A great link with the past was departing, but the Society was fortunate in having secured the services of Mr. Thomason, Mr. Gregory's partner, as honorary auditor.

Mr. Richard Kay, F.R.G.S., proposed, Mr. J. Howard Hall seconded, and it was unanimously resolved that : The best thanks of this meeting be tendered to the Rt. Hon. The Lord Mayor, for the use of his Parlour, and for presiding at this Annual Meeting.

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The 1,102nd Meeting of the Society held on Tuesday, October 7th, 1919, at 7.30 p.m. Colonel H. T. Crook, D.L., V.D., presided.

The Chairman stated that unfortunately death had been busy in our ranks during the summer, and referred particularly to the loss the Society had sustained by the death of the Chairman of the Council, Mr. Fritz Zimmern, F.R.G.S., who had held office from the formation of the Society in 1884. The other deaths noted with regret were :—Rt. Hon. Louis Botha, and the Rev. Dr. R. Swallow (Honorary Members), Messrs. George Atkinson, F.R.G.S., Wm. Ashworth, F.C.A., Joseph Gregory, Wm. Hawkins, Alexander Neil, James Smith, R. B. Stoker, John Webster and Thomas Wilkinson.

It was announced that the following had been elected Ordinary Members of the Society :—Mrs. Huntbach, Mrs. Margaret Rayner, Miss Edith Clayton, Miss Cecilia Marsh, Miss Bertine Polak, Messrs. Elisha Bardsley, J.P., Harry S. Fairhurst, F.R.I.B.A., Henry Fildes, J.P., James Harrop, James Parr, Herbert Rayner, Rev. H. Wild and Samuel Wood; and Mrs. W. L. Gaudie as Associate Member.

The Report of the Delegate to the British Association Meeting was submitted and taken as read. (See p. 55.)

Mr. Wm. Barnes Steveni, M.J.I., gave a lecture on "1,500 Miles through Great Russia, Little Russia, and the Caucasus," illustrated by lantern slides.

A vote of thanks to the Lecturer was passed.

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The 1,103rd Meeting of the Society held on Friday, October 10th, 1919, at 3.30 p.m. Mr. E. W. Mellor, J.P., F.R.G.S., presided.

The death of the Hon. Alfred Deakin (Honorary Member) was noted with regret.

The Rev. J. H. Burkitt delivered a lecture on "Italy's Glorious Struggle for Unity," which was illustrated by lantern slides.

Thanks were accorded to the Lecturer.

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The 1,104th Meeting of the Society was held on Tuesday, October 14th, 1919, at 7.30 p.m. Mr. E. W. Mellor, J.P., F.R.G.S., presided.

The Rev. Arthur B. Fisher, C.F., F.R.G.S., delivered a lecture on "Our East African Possessions," illustrated by lantern slides.

On the motion of the Chairman, a hearty vote of thanks was accorded to the Lecturer for his interesting and instructive address.

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The 1,105th Meeting of the Society held on Tuesday, October 21st, 1919, at 7.30 p.m. Mr. J. E. Balmer, F.R.G.S., presided.

The Chairman announced a further donation towards the deficiency from Miss Kate Qualtrough of £1 1s. It was also announced that the following had been elected Ordinary Members of the Society :—Miss F. A. Beech, Miss Isabel Mary Humphries, Miss Ingleby, Miss Edith M. Ireland, Miss M. A. Marshall, Miss A. I. Munro, Miss E. J. Munro, Miss Lilian Oldfield, Messrs. Edwin H. Cookson, Frank Cordingley, L. Feeney, A. B. Goss, John Taylor Jones, D. Lee, Thomas Nichol, Frank Nyder, H. W. Ogden, B.Sc., Alan S. Ogilvie, O.B.E., M.A., B.Sc., F.R.G.S., James Eric Wynfield Rhodes, and Harold Webster; and as Associate members Miss Lily Beech and Miss Maud Wagstaffe.

Mr. J. E. Phythian lectured on "The Yorkshire Dales," illustrated by lantern slides, in many cases contrasting the effect as portrayed by the artist with the view taken by the camera.

The lecturer was accorded a hearty vote of thanks.

The 1,106th Meeting of the Society held on Tuesday, October 28th, 1919, at 7.30 p.m. Mr. George Ginger presided.

The Rev. Arthur F. Fox, M.A., gave a lecture on " A Corner in Devon," illustrated by lantern slides.

A hearty vote of thanks was accorded to the Lecturer.

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The 1,107th Meeting of the Society was held on Tuesday, November 4th, 1919, at 7.30 p.m. The President, Mr. Harry Nuttall. J.P., F.R.G.S., was in the Chair.

The death was noted with regret of Mr. Henry Briggs and Mr. Maurice Wilks.

It was announced that the following had been elected Ordinary Members of the Society :—Miss C. Welfitt Nicholls, Miss Winifred Ostara, Miss Edith Sawer, Messrs. J. B. Chorlton, P. Foden, and William Hutchinson; and Miss C. H. Booth as an Associate Member.

The following recent additions to the Library were announced :—

Barographic Records taken at Alexandra Park; Volume 4 for 1918 and 1919 (Sept.). Rt. Rev. the Lord Bishop of Salford.

Ten Volumes. Mr. George Thomas, J.P.

Through the Highlands of Siberia, by Col. H. G. Swayne, R.E.

Four Volumes; for the John Walkden Memorial Collection.

Year Book of Canada, 1918, Jubilee Volume giving a historical review. High Commissioner for Canada.

Maps. The Norwegian Geographical Institute.

Lantern Slides of New York. Mr. J. Herbert Cooke.

Special Edinburgh Number of the Royal Scottish Geographical Society.

The President said he thought they would all regard this as quite a special evening as they were to have an address for the first time from their respected Dean. " Soon after his arrival, without our seeking him, he came and joined our Society, which we very much appreciated. and we consider he added to it both by distinction and strength. His address to-night is on South Africa. I don't think we, as Britishers, could have a more interesting subject; its history and everything regarding it is of a most attractive character. It is one of the most important stations, we might call it, of the British Empire, corresponding in a sense with the great peninsula of India. And when we picture the map of the world we realise its importance, its developing importance, as part of that family of nations which is rapidly growing and consolidating this great Empire—the greatest the world has ever seen—and conducted on lines which makes for its stability, the chief condition of which is a good and benevolent Government. It was said to me not long ago by an eminent judge that the Indian Government is so careful that the natives shall not be exploited that it would rather hinder the development of the country. I think that is a fault on the right side as showing justice and a careful government of the British Empire by those chiefly responsible for it. The respected Dean tells me he has been twice in South Africa, and I am sure we shall have a most interesting address, largely from personal knowledge, but from other kinds of knowledge as well."

The Dean of Manchester (the Very Rev. W. S. Swayne, B.D.) then delivered a lecture on "South Africa," with lantern illustrations. (See p. 1.)

On the proposition of the President, a hearty vote of thanks was accorded to the Lecturer.

The 1,108th Meeting of the Society held on Friday, November 7th, 1919, at 3.30 p.m. Mr. E. W. Mellor, J.P., F.R.G.S., presided.

Professor P. M. Roxby, B.A., F.R.G.S., delivered an address on "Some Impressions of Northern China."

The Lecturer received the unanimous thanks of the meeting for his interesting and illuminating address.

The 1.109th Meeting of the Society held on Tuesday, November 11th, 1919, at 7.30 p.m. Colonel H. T. Crook, D.L., V.D., in the chair.

Mr. J. G. Birkby, M.A., lectured on "The History of Manchester in Pictures," fully illustrated by lantern slides.

The address was highly appreciated by a large audience, whose cordial thanks were accorded to the Lecturer.

The 1,110th Meeting of the Society held on Tuesday, November 18th, 1919, at 7.30 p.m. Colonel H. T. Crook, D.L., V.D., presided.

The death of Sir William MacGregor, G.C.M.G., etc. (Honorary Member since 1895), was noted with regret.

It was announced that the following had been elected Ordinary Members of the Society:—Mrs. B. M. Lee, Miss Marion Cookson; Messrs. T. H. Bridge, W. P. James, and J. Harcourt Willson; and as Associate Members: Miss Ethel Foden, Miss Florence Taylor and Mr. Graham Clarke.

Mr. Elisha Bardsley, J.P., delivered an address on "3,000 Miles of Battle Front," with lantern illustrations.

A hearty vote of thanks was accorded to the Lecturer.

The 1,111th Meeting of the Society was held on Tuesday, November 25th, 1919, at 7.30 p.m. Colonel H. T. Crook, D.L., V.D., presided.

Dr. W. E. Gibbs, D.Sc., delivered a lecture on "British Malaya: a Story of Empire," fully illustrated by lantern views and maps. (See p. 8.)

On the proposition of the Chairman, the Lecturer was accorded a cordial vote of thanks.

The 1,112th Meeting of the Society was held on Tuesday, December 2nd, 1919, at 7.30 p.m. Mr. C. A. Clarke presided.

Mr. Charles Sutton, F.A.I., delivered a lecture on his "Journeys among the Swiss Alps," illustrated by lantern slides mainly from his own photographs.

A hearty vote of thanks was accorded to the Lecturer, The 1,113th Meeting of the Society was held on Friday, December 5th, 1919, at 3.30 p.m. Mr. E. W. Mellor, J.P., F.R.P.S., F.R.G.S., presided.

Mrs. Keith Adams delivered an address on "Mauritius," illustrated by lantern slides, mainly from original photographs.

On the proposition of the Chairman, Mrs. Adams was accorded the thanks of the meeting.

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The 1,114th Meeting of the Society was held on Tuesday, December 9th, 1919, at 7.30 p.m. Mr. J. E. Balmer, F.R.G.S., presided.

The Rev. Alexander Taylor, M.A.. delivered a lecture on "Jugo Slavia : a New European State," illustrated by many lantern slides.

The cordial thanks of the meeting were tendered to Mr. Taylor for his interesting and suggestive address.

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The 1,115th Meeting of the Society was held on Tuesday, December 16th, 1919, at 7.30 p.m. The Very Rev. W. S. Swayne, B.D., Dean of Manchester, presided.

In introducing the Lecturer the Chairman said : It is rather a difficult thing to introduce a member of one's own family; one does not quite know what to do, or what to say about him; but I think he is really a suitable person to lecture to the Geographical Society. According to the flesh he is quite an ordinary normal Anglo-Saxon; according to the spirit he is an Ishmaelite—a lover of tents and of the open road, and so far as his military profession has permitted he has always been consumed by the "wanderlust." In point of age he is slightly my senior. I mention that because I am just going to tell you something that is characteristic of him. The other day, not having anything particular to do, and a little time on hand, he started off and walked from London to Hereford. That will show you he is a man who likes the open road, and to be on the move, and I find that at the present moment he is hankering for India, and more possibly Cashmere. I am not going to detain you, and I am now going to ask him to give you his lecture on "Siberia's Place in Asia."

Colonel H. G. C. Swayne, C.M.G., R.E., then delivered his lecture on "Siberia's Place in Asia," illustrated by lantern views and maps. (See p. 19.)

At the conclusion of the lecture the Chairman said :—I think I can offer Colonel Swayne the very hearty thanks of this gathering for his extraordinarily interesting lecture. Whether trade is going to journey from north to south instead of from east to west I should think was still an open question. It was an interesting suggestion to me. It had not occurred to me as at all possible before, but he knows more about those countries than I do. I do not think he need apologise for telling us about such dull things as the Siberian Railway. Very few of us know much about it except from hearsay; we have not had the advantage of travelling over it. His journey down south to the borders of Mongolia, looking for the big sheep, touches a part of the country that I imagine must be entirely unknown to the great majority of those present. One can see at once what an extraordinarily important part Siberia may play in the future of Asia. A country that is capable of supporting a great white population is sure to dominate the future of Asia. Well, now, I do not know whether it is in order to move a vote of thanks to the lecturer, but I am sure we may offer him our hearty thanks for all that he has told us, and I hereby do so.

Colonel H. T. Crook, D.L., V.D., thereupon rose and said :—Before we part this evening I think you will expect something to be said under the circumstances. We know our worthy Chairman is shortly to take a journey—not from north to south, but from west to east—and will very shortly be leaving us, having been called to a higher sphere. I am sure, therefore, we should not like to part to-night without offering to him our respectful congratulations on his appointment and our firm belief that he will add further distinction to that long list of prelates in that historical See to which he has been called. We have, I think, to-night had a double pleasure—we have had the Dean to preside, and we have had a relative of his to give us this most interesting paper on Siberia. The Dean has not been for a very long time amongst us, and I am sure we are all very sorry he is leaving us. As a Society we are grateful to him that he has taken part in our work, and that he has been instrumental to-night in getting us this very excellent paper; giving us information on a part of the world which I think a great many of us have not hitherto known much about. I do not know that there is anything further to be said, but I think we all feel that our worthy Dean will, as I say, be the right man in the right place in that noble old See of Lincoln. I listened to him one night at the Engineers' Club dinner, when he made some rather cutting remarks about our climate. I am sure the climate of the city to which he is going is certainly superior to that of Manchester; still, even from high ground where the sacred fane stands, and where, I believe, the Bishop's Palace also is, you see on the lower part—the new Lincoln—some signs of industry, and I am afraid the Dean will not altogether escape occasional smoke even in that ancient city. I beg to move a hearty vote of thanks to him for presiding.

Mr. C. A. Clarke, in seconding the vote, which was carried with acclamation, said :—We have always welcomed him here as the Dean of Manchester, and we shall always give him an equally cordial welcome when he comes to us as the Bishop of Lincoln.

The Dean, in acknowledging the vote, said :—I am very grateful for the kind words that have been spoken to-night. These leave-takings are rather painful. I have only been here a year, but I am honestly deeply sorry to go. I do not think I have even spent a happier year in all my life than I have spent in Manchester. I do not know that I have had a very unhappy life as a whole; I have nothing to complain of, but really Manchester is an extraordinarily interesting and fascinating place. When I wrote to the new Dean of Manchester I told him that I thought the post of Dean of Manchester was the most attractive and most interesting in the Church of England, and I do believe it. You will say, "Well, why do you go?" That is a very reasonable question, and the only reason is this. I have always felt, and I have always told other people, that if, without your seeking, a post of greater responsibility comes in your way, probably you ought to undertake it and do your best, and I do feel that if I declined it I should always feel for the rest of my life I had shirked a responsibility. That is not a very comfortable position. I do not want to be a bishop. Personally, I rather appreciate freedom. As Dean of Manchester you are extraordinarily free. There is plenty to do. but you can make your own life. As a bishop you are tied down in every respect. You are the servant of great masses of people, and perhaps that is good for you. But everybody tries to make you dance to their tune. That is not equally agreeable. It is better to take your own line and go your own way. I am grateful to you for all you have said, and I am thankful I have persuaded my cousin to come down and lecture to you. He is one of those Britishers who does know how to get on with all races—there are some who can do that and some who can not. He is one who can, and he gets on with the yellow man, the black man, and the brown man. He loves a great many of them, but he is not a sentimentalist about them, and sometimes deals with them in a rough way. He understands them as human beings, and I think they understand him. It is only Britishers of a high type who are capable of this with the brown and red races. He is one of those Britishers; he does know how to handle what are still the more childish races of the world, and that is the reason why he has travelled a great many parts of the world safely and comfortably, and has enjoyed his travelling. I am grateful to you, and grateful to the lecturer also.

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The Annual Children's Meeting was held on Tuesday, December 23rd, 1919, at 6.0 p.m. Mr. E. W. Mellor, J.P., F.R.P.S., F.R.G.S., presided.

Mr. Henry Crowther, F.R.M.S., Curator of the Leeds Museum, delivered a lecture to the children of members and friends on "Our Colonies, their People, and their Products." Mr. Crowther's address was illustrated by many beautifully coloured lantern views; and told a story of the Empire, of the use of our Colonies, of wild countries and all manner of people, and was a good introduction to the study of Greater Britain.

The enthusiastic thanks of the children were accorded to the Lecturer.

# List of Maps, Books, Journals, etc.,

ACQUIRED BY THE SOCIETY
FROM JANUARY 1st TO DECEMBER 31st, 1919.

## Maps.

### EUROPE.

Political Map of the New States of Europe in 1919 according to the Treaties of Paris The Old States of 1914 and the New of 1919. Scale, 86 miles to 1 inch. Edinburgh : John Bartholomew & Son, 1919.

Bacon's Plan of Bournemouth. Scale, four inches to 1 mile.

Norway. Topografisk kart over kongeriket Norge. Gradavdeling N 8; M 6; M 11; W 5; X 5; Rektanget 10 B. Kristiania : Norges Geografiske Opmaaling, 1917-1918. *Norges Geografiske Opmaaling.

Norway. Landgeneralkart over Norge. 1/250.000. Blad XX, LVI. Kristiania : Norges Geografishe Opmaaling, 1918. *Norges Geografiske Opmaaling

Beretning om Norges Georgrafiske Opmaalings Virksomhet tidsrummet. 1 Juli, 1917—30 June, 1918. Kristiania : Norges Geografiske Opmaaling. *Norges Geografiske Opmaaling.

Katalog over Landkarter. Kristiania : Norges Geografiske Opmaaling, 1919. *Norges Geografiske Opmaaling.

La Carte Ethnographique de la Hongrie basée sur la densité de la population par le Comte Paul Teleki. Scale, 1/1,000,000. Budapest : Institut Géographique Hongrois, 1919. *The Publisher

### OCEANIA.

Victoria. Water Supply and Agriculture. Scale, 23 miles to 1 inch. Prepared under the direction of the Minister of Lands for Victoria. Melbourne : Immigration and Labor Bureau, 1914. *The Land Settlement and Immigration Commissioner for Victoria.

Victoria. Railways, Schools, etc. Scale, 23 miles to 1 inch. Prepared under the direction of the Minister of Lands for Victoria. Melbourne : Immigration and Labor Bureau, 1914. *The Land Settlement and Immigration Commissioner for Victoria.

Tasmania. Scale, 12 miles to 1 inch. Hobart : Surveyor General, 1915. *The Agent General for Tasmania.

### ATLASES, PHOTOGRAPHS, Etc.

A list of Atlases and Maps applicable to the World War. Compiled under the direction of Philip Lee Phillips, Chief. Washington : Library of Congress, 1918. *The Library of Congress.

Queensland. Album of Views, South Coast and Seaside. Brisbane, 1916. *The Agent General for Queensland.

Lantern Slides of New York. *Mr. J. H. Cooke.

# Books.

## GENERAL.

The Voyage of the "Wanderer"—a Cruise round the World. From the Journals and Letters of C. and S. Lambert. Edited by Gerald Young. Chart and Illustrations. London, 1883. *Mr. George Thomas, J.P.

The Foundations of Geography in the Twentieth Century. By Prof. Franz Schrader. Herbertson Memorial Lecture, 1919. Oxford: Clarendon Press, 1919. (Price 2/6 net.) *The Delegates of the Clarendon Press.

Frontiers. A Study in Political Geography. By C. B. Fawcett, B.Litt., M.Sc. Diagrams. Oxford, 1918.

The Geographical Teacher. No. 54, Vol. X, Part 2.

The Study of the Weather. By E. H. Chapman, M.A., B.Sc., F.R.Met.S. Maps and Illustrations. Cambridge: University Press, 1919. (Price 3/6 net.) *The Publishers.

Practical Exercises on the Weather and Climate of the British Isles and North West Europe. By W. F. Stacey, F.R.G.S., F.R.Met.Soc. Map. Tables. Cambridge: University Press, 1919. (Price 2/6 net.) *The Syndics of the Cambridge University Press,

Petrology for Students. An Introduction to the Study of Rocks under the Microscope. By Alfred Harker, M.A., LL.D., F.R.S., F.G.S. Illustrations. Fifth Edition, Revised. Cambridge: University Press, 1919. (Price 8/6 net.) *The Syndics of the Cambridge University Press.

Accounts Rendered of Work Done and Things Seen. By J. Y. Buchanan, M.A., F.R.S. Charts. Diagrams. Illustrations. Cambridge: University Press, 1919. (Price 21/- net.) *The Author.

An Almanack, 1919. By Joseph Whitaker, F.S.A. London, 1919.

Colonies et Marine. Annee 3. Nos. 1—8. Paris, 1919. *The Publishers.

## BRITISH ISLES.

Barographical Record. By the Right Rev. the Bishop of Salford's Barograph at St. Bede's Lodge, Alexandra Park, Manchester. Vol. IV, 22 Sept., 1918, to 4 Oct., 1919. *The Right Rev. the Bishop of Salford.

Bournemouth. Poole and Christchurch. Described by Sidney Heath. Painted by Ernest Haslehurst. London, 1915.

The Official Guide to Bournemouth. Illustrated. 87th Annual Meeting of the British Association for the Advancement of Science. Sept., 1919. Bournemouth, 1919.

A Natural History of Bournemouth and District, including Archæology, Topography, Municipal Government, Climate, Education, Fauna, Flora, and Geology. By the Members of the Bournemouth Natural Science Society. Edited by Sir Daniel Morris, K.C.M.G., J.P., M.A., etc. President. Maps and Illustrations. Bournemouth, 1919.

The Strife of the Roses and Days of the Tudors in the West. By W. H. Hamilton Rogers, F.S.A. Illustrated by Roscoe Gibbs. Exeter, 1890. *Mr. George Thomas, J.P.

Yorkshire Moors and Dales. A description of the Moors of North-East Yorkshire. By Alfred P. Wilson. London, 1910. *Mr. George Thomas, J.P.

## EUROPE.

Svenska Turistforenengens Arsskrift, 1919. Illustrated. Stockholm, 1919. *The Swedish Touring Club.

Geography of France. By Professor Raoul Blanchard and Millicent Todd. Maps. Chicago: Rand, McNally and Co., 1919. *The Publishers.

Indicateur Official Guide Général de la Corse. Cartes. Plans, etc. Année 11. No. 31, Feb. 1919; No. 32, June. Paris: A. Clavel, 1919. *The Publisher.

Appeal of the Hungarian Geographical Society to the Geographical Societies of the World. Budapest, 1919. *Hungarian Geographical Society.

The Southern Frontier of German-Styria. Memorandum of the Academic Senate of the University of Graz. Edited by Robert Sieger. 2 Maps. Graz: The University, 1919. *The Publishers.

Greece before the Conference. By Polybius. With a Preface by T. P. O'Connor. M.P. Map. London: Methuen and Co, 1919. (Price 5s. net.) * The Publishers.

The Guadalquivir; its Personality, its People and its Associations. By Paul Gwynne. Maps and Illustrations. London: 1912. *Mr. George Thomas, J.P.

Cyprus as I saw it in 1879. By Sir Samuel White Baker, M.A., F.R.S., etc. Illustration. London: 1879. *Mr. George Thomas, J.P.

## ASIA.

" Through Samaria " to Galilee and the Jordan. Scenes of the early life and labours of Our Lord. By J. L. Porter, D.D., LL.D. Illustrations. London: 1889. *Mr. C. A. Clarke.

Through the Highlands of Siberia. By Major H. G. C. Swayne, R.E., F.R.G.S. Map and Illustrations. London: 1904.

Persia and its People. By Ella C. Sykes. Map and Illustrations. London: 1910.

Journeys in Persia and Kurdistan: including a summer in the Upper Karun Region and a Visit to the Nestorian Rayahs. By Mrs. Bishop (Isabella L. Bird). Portrait, Maps and Illustrations. 2 Vols. London: 1891. *Mr. George Thomas, J.P.

Early Adventures in Persia, Susiana, and Babylonia; including a residence among the Bakhtiyari and other wild tribes before the discovery of Nineveh. By Sir A. Henry Layard. Maps and Illustrations. 2 Vols. London: 1887. *Mr. George Thomas, J.P.

Punjab District Gazetteers. Vol. VI.—A Karnal District; Maps; 1918. Vol. XXXIV.—A Part II, A and B, Muzaffargarh District, Leiah Tahsil; 3 Maps; 1916. Lahore: 1919. *H.M. Secretary for India in Council.

Central Provinces District Gazetteer. Addenda and Corrigenda to the Tables of the B Volumes of: Akola, 1916-17, 1917-18; Amraoti, 1915-16, 1916-17; Balaghat, 1916-17; Betul, 1916-17; Bhandara, 1915-16, 1916-17, 1917-18; Bilaspur, 1916-17, 1917-18; Buldana, 1916-17; Chanda, 1916-17, 1917-18; Chhindwara, 1916-17, 1917-18; Damoh, 1916-17, 1917-18; Drug, 1916-17, 1917-18; Hoshangabad, 1916-17, 1917-18; Jubbulpore, 1917; Mandla, 1916-17; Nagpur, 1916-17; Narsinghpur, 1916-17, 1917-18; Nimar, 1916-17, 1917-18; Raipur, 1916-17, 1917-18; Saugor, 1916-17, 1917-18; Seoni, 1916-17, 1917-18; Wardha, 1916-17, 1917-18; Yeotmal, 1917-18. *H.M. Secretary of State for India in Council.

Coorg District Gazetteer. B Vol. 1918. *H.M. Secretary of State for India in Council.

Bihar and Orissa District Gazetteer. Shahabad, B Vol. *H.M. Secretary of State for India in Council.

### AFRICA.

Introductory Questions on African Ethnology. By George Foucart, President of the Society. Cairo: Sultanieh Geographical Society of Cairo. 1919. *The Society.

Carthage and Tunis—The Old and New Gates of the Orient. By Douglas Sladen. 2 Vols. Maps and Illustrations. London: 1906. *Mr. John Walkden's Memorial Vol., Nos. 25, 26.

Le Sahara Occidental. Capitaine Augiéras. Map. Paris: Masson et Cie, 1919. *Société de Géographie, Paris.

Alone in West Africa. By Mary Gaunt. Map and Illustrations. London: 1912. *Mr. John Walkden's Memorial Vol., No. 27.

Sierra Leone Messenger. Nos. 103, 104. 1919. *Rev. F. C. Smith, F.R.G.S.

South West Africa. By William Eveleigh. London: 1915.

African Hunting from Natal to the Zambesi, including Lake Ngami, the Kalahari Desert, etc., from 1852 to 1860. By William Charles Baldwin, F.R.G.S. Map and Illustrations. London: 1863. *Mr. C. A. Clarke.

The Eldorado of the Ancients. By Dr. Carl Peters. Maps and Illustrations. London: 1902. *Miss Kate Qualtrough, F.R.G.S.

The Voice of Africa; Being an account of the Travels of the German Inner African Exploration Expedition, 1910—1912. By Leo Frobenius. Translated by Rudolf Blind. Maps and Illustrations. 2 Vols. London: 1913. *Mr. John Walkden's Memorial Vol., Nos. 23, 24.

Life, Wanderings, and Labours in Eastern Africa, with an account of the first successful Ascent of the Equatorial Snow Mountain, Kilima Njaro; and remarks upon East African Slavery. By Charles New. Map and Illustrations. Second Edition. London: 1874. *Mr. C. A. Clarke.

Uganda for a Holiday. By Sir Frederick Treves, Bart., G.C.V.O., C.B., LL.D. Map and Illustrations. London: 1910.

### AMERICA.

John and Sebastian Cabot—The Discovery of North America. By C. Raymond Beazley, M.A., F.R.G.S. Portrait and Maps. London: 1898. *Mr. George Thomas, J.P.

The Canada Year Book, 1918. (Jubilee Volume.) Published by Authority of the Right Hon. Sir George E. Foster, G.C.M.G., M.P., Minister of Trade and Commerce. Maps and Illustrations. Ottawa: Canada Dominion Bureau of Statistics, 1919. *The High Commissioner for Canada.

Down North on the Labrador. By Wilfred T. Grenfell, M.D., C.M.G. Illustrations. Second Edition. London: 1912.

### OCEANIA.

Official Year Book of the Commonwealth of Australia. Containing Authoritative Statistics for the period 1901—1917, and Corrected Statistics for the period 1788 to 1900. No. 11, 1918. Prepared by G. H. Knibbs, C.M.G., etc. Maps, Graphs and Diagrams. Melbourne : Minister of State for Home and Territories, 1918. *The High Commissioner for Australia.

Handbook to Victoria. Prepared for the British Association Australian Meeting, 1914. A. M. Laughton, F.I.A., F.F.A., Editor; T. S. Hall, M.A., D.Sc., Associate Editor. Maps, Plans, Diagrams, and Illustrations. Melbourne : 1914. *The Land Settlement and Immigration Commissioner for Victoria.

Railway Tours of Central Queensland. Illustrated. Brisbane. *The Agent-General for Queensland.

Queensland Sugar Industry. Map and Illustrations. Brisbane : Intelligence and Tourist Bureau, 1913. *The Agent-General for Queensland.

Queensland Sheep and Wool Industry. Map and Illustrations. Brisbane : Intelligence and Tourist Bureau, 1918. *The Agent-General for Queensland.

The Pocket Brisbane—Tourists' Guide. Sixth Edition. Illustrated. Brisbane : Intelligence and Tourist Bureau, 1918. *The Agent-General for Queensland.

South Australia. Handbook of Information for Settlers, Tourists and others. Compiled by V. H. Ryan. Third Edition, and Supplement. Map and Illustrations. Adelaide : 1914. *The Agent-General for South Australia.

Handbook of Tasmania. Section I. Map and Illustrations. Hobart : 1912. *The Agent-General for Tasmania.

New Zealand. By C. H. Scholefield, B.Sc. (International Information Series, British Empire Section, Vol. IV.) London : 1917. *The High Commissioner for New Zealand.

The New Zealand Official New Book, 1918. 27th year of issue. Prepared by Malcolm Fraser, Government Statistician. Wellington, N.Z. : 1918. *The High Commissioner for New Zealand.

North Auckland, New Zealand. 2nd Edition. Illustrated. Auckland : 1918. *The High Commissioner for New Zealand.

New Zealand. Monthly Abstract of Statistics. November-December, 1919. *The High Commissioner for New Zealand.

Two Years among New Guinea Cannibals. A Naturalist's Sojourn among the Aborigines of Unexplored New Guinea. By A. E. Pratt. With Notes and Observations by his Son, Henry Pratt, and Appendices on the Scientific Results of the Expedition. Map and Illustrations. London : 1906.

# List of Corresponding Societies, etc. (Exchanges).

## BRITISH.

Birmingham. Natural History and Philosophical Society. Annual Report, 1918. Proceedings. Vol. XIV., Part III., 1917-19.

Croydon. Natural History and Scientific Society. Proceedings and Transactions. Vol. VIII., Part V., 1918.

Edinburgh. The Royal Scottish Geographical Society. The Scottish Geographical Magazine, 1919. Vol. XXXV., Nos. 1-12 and Index.

Liverpool. Geographical Society. Transactions and Twenty-seventh Annual Report for the year 1918.

London. The Anti-Slavery Reporter and Aborigines' Friend. 1919. Series V, Vol. VIII., No. 4; IX., 1, 2, 3.

London. British Association for the Advancement of Science. Report, 1918. Report of the Corresponding Societies' Committee and of the Conference of Delegates, 1918.

London. Colliery Guardian, 1919. Nos. 3027—3078.

London. The Colonial Journal, 1919. Vol. XII, 3, 4; XIII, 1, 2.

London. The Royal Colonial Institute Journal. "United Empire," 1919. Vol. X., Nos. 1-12. Index.

London. East India Association. Journal, 1919. Vol. X., Nos. 1-4.

London. Royal Geographical Society. The Geographical Journal, 1919. Jan. to Dec. Supplement Nos. 3, 4.

London. Imperial Institute. Bulletin, 1919. Vol. XVII., Nos. 1-3.

London. India Office. (See List of Books.)

London. Royal Botanic Gardens, Kew. Bulletin, 1919. Nos. 1-10 and Appendices I-II.

London. The Near East, 1919. Nos. 400-451.

London. War Office. Geographical Section, General Staff. (See List of Maps.)

London. War Office Library. Accessions, 1919. January to December. Catalogue, Part III. Seventh Annual Supplement, 1918.

Manchester. The British Cotton Growing Association. Publications. No. 68. 14th Annual Report, 1918.

Manchester. Literary and Philosophical Society. Memoirs and Proceedings. Vol. 62, Parts II., III.

Manchester. Manchester Museum. Publications, 82, 83.

Manchester. Textile Recorder, 1919. January to December.

Newcastle-on-Tyne. North of England Institute of Mining and Mechanical Engineers. Transactions. Vols. LXVIII. Parts 5-8. Annual Report, 1917-18.

Oxford. Clarendon Press. (See List of Books.)

Rochdale. Literary and Scientific Society. 41st Annual Report, 1919. Transactions, Vol. XIII, 1917-19.

Salford. Museums, Libraries and Parks Committee. 70th Report. 1917-18.

York. Yorkshire Philosophical Society. Annual Report for 1918.

## MISSIONARY.

London. Baptist Missionary Society. The Herald. 1919. January to December.

London. The British and Foreign Bible Society. " The Bible in the World," 1919, January to December.

London. Church Missionary Society for Africa and the East. Proceedings. 1918-19.

London. Church Missionary Review, 1919. Quarterly.

London. Colonial and Continental Church Society. Greater Britain Messenger, 1919. January to December.

London. Society for Propagation of the Gospel in Foreign Parts. Report of the year 1918.

London. Universities' Mission to Central Africa. " Central Africa." 1919. January to December.

London. The United Methodist Church. "Missionary Echo." 1919. March to December.

## COLONIAL.

Adelaide. Royal Geographical Society of Australasia; South Australian Branch. Proceedings for the Session. 1917-18. Vol. XIX.

Brisbane. Royal Geographical Society of Australasia; Queensland Branch. Queensland Geographical Journal. Vols. XXXII—XXXIII, 1916-1918.

Brisbane. Queensland Museum. Memoirs. Vol. VI.

Brisbane. Department of Mines. Queensland Geological Survey. Publications, Nos. 256, 262, 263, 264.

Bulawayo. Rhodesia Scientific Association. Annual Report, 1918-19.

Cape Town. Royal Society of South Africa. Vol. VII, Part 3, Vol. VIII, Part 1.

Cape Town. Mountain Club of South Africa. Annual. No. 22, 1919.

Halifax. Nova Scotian Institute of Science. Proceedings and Transactions. Vol. XIV., Part 4.

Johannesburg. South African Geographical Journal. 1918. Vol. II., No. 1.

Perth. Western Australia Geological Survey (per favour of the Agent-General). Bulletins, Nos. 77, 82.

Port Moresby. Papua. Annual Report for the year 1917-1918.

Quebec. Société de Géographie. Bulletin. Vol. XIII., Nos. 1-5, 1919.

Toronto. Royal Canadian Institute. Transactions. No 27. Vol. XII, Part I. May, 1919.

Victoria, B.C. Minister of Mines. Province of British Columbia. Annual Report, 1918.

Wellington, New Zealand. Department of Lands and Survey. Report, 1919. Parts C 1, C 1 A, C 6.

## FOREIGN.

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Antwerp. Société Royale de Géographie D'Anvers. Bulletin. 1914, Tome XXXVIII, Fasc 1-4; 1919, Tome XXXIX, Fasc. 1-2.

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Buenos Aires. Monthly Bulletin of Municipal Statistics. 1919, Nos. 3, 4.

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Chicago. The John Crerar Library. Annual Report. 1918..

Christiania. Norges Geografisk Opmaaling. (See List of Maps.)

Copenhagen. Geografisk Tidskrift udgivet of Bestyrelen for det Kongelige Danske Geografiske Selskab. Bind XXV., Hefte I, II, IV.

Firenze (Florence). Revistà Geografica Italiana e Bollettino della Societá di Studi Geografici e Coloniali. Annata XXVI, Fascs. 1-10.

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Helsingfors. Geografiska Föreningen i Finland. Meddelanden. Vol. X., 1913-14.

La Paz. Sociedad Geografica. Boletin. Ano XVII, No. 48.

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Lille. Société de Géographie. Bulletin, 1914. No. 5. May-December.

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Mexico. Sociedad Cientifica "Antonio Alzate," Memorias y Revista. Tomo XXXVII., 2; XXXVIII., 3-8.

Milan. L'Esplorazione Commerciale. Anno XXXIV. Fascs. 1-12.

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Paris. Société de Géographie. La Géographie. Tome XXXI., Nos. 6-8; XXXII., 1-6.

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Philadelphia. The Commercial Museum. "Commercial America." 1919, January—April; June—December.

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## I. OBJECT AND WORK.

The object of the Manchester Geographical Society is to promote the study of all branches of Geographical Science, especially in its relations to commerce and civilisation.

The work of the Society shall be :—

1. To further in every way the pursuit of the science; as, by the study of official and scientific documents, by communications with learned, industrial and commercial societies, by correspondence with consuls, men of science, explorers, missionaries, and travellers, and by the encouragement of the teaching of geography in schools and colleges.

2. To hold meetings at which papers shall be read, or lectures delivered by members or others.

3. To examine the possibility of opening new markets to commerce and to collect information as to the number, character, needs, natural products and resources of such populations as have not yet been brought into relation with British commerce and industry.

4. To promote and encourage, in such way as may be found expedient, either alone or in conjunction with other Societies, the exploration of the less known regions of the earth.

5. To inquire into all questions relating to British and Foreign colonisation and emigration.

6. To publish a Journal of the proceedings of the Society, with a summary of geographical information.

7. To form a collection of maps, charts, geographical works of reference, and specimens of raw materials and commercial products.

8. The Society shall not enter into any financial transactions beyond those necessarily attached to its declared object, and shall not make any dividend, gift, division, or bonus in money unto or between any of its members.

## II. ORGANISATION.

9. The Society shall consist of ordinary, associate, corresponding, and honorary members.

10. A Council shall be chosen annually from the ordinary members to conduct the affairs of the Society. It shall consist of a President, four or more Vice-Presidents, a Treasurer, two or more Honorary Secretaries (including a Secretary for Foreign Correspondence), and twenty-one Councillors.

11. There shall be three Trustees elected by the Society, who shall hold office until death, disability, insolvency, or resignation. They shall be members of the Council by virtue of their office.

12. Any vacancy occurring in the Council during the current year may be filled up by the Council.

## III. ELECTION OF MEMBERS.

13. Every candidate for admission into the Society as an ordinary or an associate member must be proposed by a member. The proposal shall be read out at the next Ordinary Meeting of the members, and any objection shall be forwarded in writing to the Secretary within seven days.

14. The election of members is entrusted to the Council. The names of those elected shall be announced from the chair at the next Ordinary Meeting after the election.

15. The Secretary shall within three days forward to every newly-elected member notice of his election, a copy of the Rules of the Society, and a card announcing the days on which the Ordinary Meetings will be held during the session. But the election of an ordinary or associate member shall not be complete, nor shall he be permitted to enjoy the privileges of a member, until he shall have paid his first year's subscription. Unless such payment be made within three calendar months frcom the date of election the election shall be void.

16. The Council shall have power to elect honorary and corresponding members.

17. Women shall be eligible as members and officers of the Society.

## IV. PAYMENTS.

18. An ordinary member shall pay an annual subscription of £1. 1s., or he may compound by one payment of £10. 10s. An associate member shall pay an annual subscription of 10s. 6d. The Society's year shall begin on the first day of January.

19. Members shall not be entitled to vote or to enjoy any other privilege of the Society so long as their payment shall continue in arrear, but associate members shall not vote nor shall they take any part in the government of the Society.

20. The first annual payment of a member elected in November or December shall cover his subscription to the 31st December in the year following.

21. On the first day of January in each year there shall be put up in the rooms of the Society a complete list of the members with the amount of their subscription due, and as the amounts are paid the fact shall be marked on the list.

22. Notice shall be sent to every member whose subscription shall not have been paid by the first of February, and if the arrears are not discharged by the first of July the Council may remove the member from the list of members. Any member, whose subscription is in arrear for two years shall not be entitled to receive the Journal of the Society.

## V. MEETINGS.

23. The meetings of the Society shall be of three kinds—Ordinary, Annual, and Special.

24. In all meetings a majority of those present shall decide all questions, the President or Chairman having a casting vote in addition to his own.

### Ordinary Meetings

25. The Ordinary Meetings of the Society shall be held once a month, from the month of October to the month of May, or oftener, if judged expedient by the Council.

26. All members whose subscriptions are not in arrear shall have a right to be present. All ordinary members shall have the privilege of introducing one visitor.

27. The order of the proceedings shall be as follows :—

(a) The minutes of the last meeting to be read and if correctly recorded they shall be signed by the Chairman.
(b) Presents, whether of money, books, maps, charts, instruments or specimens made to the Society to be announced.
(c) The election of new members to be declared and the names of candidates to be read.
(d) Papers and communications to be read and discussed.

28. At these meetings nothing relating to the rules or management shall be brought forward, but the minute book of the Council shall be on the table at each meeting for the inspection of any member, and extracts therefrom may, with the consent of the chairman, be read to the meeting on the requisition of any member.

29. On occasions of exceptional interest the Council may make provision for a larger admission of visitors.

### Annual Meetings.

30. The Annual Meeting of the members shall be held at such time and place as the Council may determine.

31. Fourteen days' notice of such meeting shall be sent to every member within the United Kingdom who has given his address to the Secretary, and notice of the meeting shall be advertised in such newspapers as the Council may direct.

32. The object of this meeting shall be to receive the Annual Report of the Council and the Treasurer's Balance Sheet, to hear the President's address, to elect the Council and officers for the ensuing year, and to transact any other business.

33. Any two ordinary members may nominate candidates for the Council or for office not later than one week prior to the day of election, and the names of candidates so nominated shall be at once put up in the rooms of the Society. The election of the Council and officers shall be by ballot.

### Special General Meetings.

34. The Council may call a Special General Meeting of the Society whenever they shall consider it necessary, and they shall do so if required by 20 ordinary members.

35. A week's notice of the time and object of every Special Meeting shall be sent to all members. No other business shall be entertained than that of which notice has been thus given.

36. Twenty ordinary members shall form a quorum.

## VI. COUNCIL AND OFFICERS.

### The Council.

37. The government of the Society shall be entrusted to the Council, subject to the rules of the Society.

38. The Council shall annually elect a Chairman and Vice-Chairman.

39. The President or the Chairman, or any three members of the Council, may at any time call a meeting thereof, to which every member of the Council shall be summoned.

40. Seven shall form a quorum.

41. In order to secure the most efficient study and treatment of the various subjects which constitute the chief work of the Society, the Council may appoint Committees for special purposes. These Committees, with the approbation of the Council, may associate with themselves any persons—whether members of the Society or not—from whom they may desire to obtain special assistance or information. The Committee shall report to the Council the results of their proceedings.

42. The President, Chairman, Vice-Chairman of the Council, and the Honorary Secretaries, shall, by virtue of their offices, be members of all Committees appointed by the Council.

### President and Vice-Presidents.

43. The President is, by virtue of his office, the chairman of all the meetings of the Society. In the absence of the President, one of the Vice-Presidents may preside.

### Chairman of the Council.

44. It is the duty of the Chairman of the Council to see that the rules are properly observed, to call for reports and accounts from Committees and officers, and to summon, when necessary, special meetings of the Council and of Committees.

### Treasurer.

45. The Treasurer has the charge of all accounts; he shall pay all accounts due by the Society after they have been examined and approved by the Council.

46. He shall see that all moneys due to the Society are collected, and shall have power, with the approval of the Council, to appoint a collector. All moneys received shall be immediately paid to the bankers of the Society.

47. The bank passbook and the book of accounts shall be laid upon the table at every ordinary meeting of the Council.

48. The accounts shall be audited annually by two members, who shall be elected at an ordinary meeting at least one month before the Annual Meeting.

### Secretaries.

49. The duty of the Honorary Secretaries shall be:—

(a) To conduct the correspondence of the Society and of the Council.

(b) To attend the meetings of the members and of the Council, and minute their proceedings.

(c) At the ordinary meetings, to announce gifts presented to the Society since their last meeting; to read the names of all new members and of candidates for admission, and the papers communicated to the Society, which have been directed by the Council to be read.

(d) To have immediate superintendence of all persons employed, to make arrangements for the meetings of the Society, and to take charge of all maps, books, furniture and other effects.

50. It shall be the more especial duty of one of the Honorary Secretaries to conduct, as may be directed by the Council, correspondence with Foreign Societies, and with persons resident abroad.

51. In addition to the Honorary Secretaries, there shall be a paid Secretary appointed by the Council, whose duties shall be to assist the Honorary Secretaries, to issue the notices of the Council and of the Society, and to act under the instructions of the Council.

The foregoing rules, as now amended, were approved and adopted at a meeting of the members of the Society, of which due notice had been given to the members, held in the Town Hall, Manchester, Wednesday, October 3rd, 1894.

(Signed) GEORGE, President.
S. ALFRED STEINTHAL, Chairman.
F. ZIMMERN, Honorary Secretary.
JAS. D. WILDE, M.A., Honorary Secretary.
ELI SOWERBUTTS, Secretary.

[Copy.]

It is hereby certified that this Society is entitled to the benefit of the Act 6 and 7 Vict., Cap. 36, intituled "An Act to exempt from County, Borough, Parochial, and other Local Rates, Lands and Buildings occupied by Scientific or Literary Societies."

Seal of Registry of
Friendly Societies.

This 15th day of January, 1895.

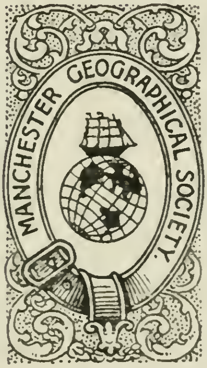
E. W. B.

THE

# JOURNAL

OF THE

# MANCHESTER GEOGRAPHICAL SOCIETY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# MANCHESTER GEOGRAPHICAL SOCIETY

FOR 1920.

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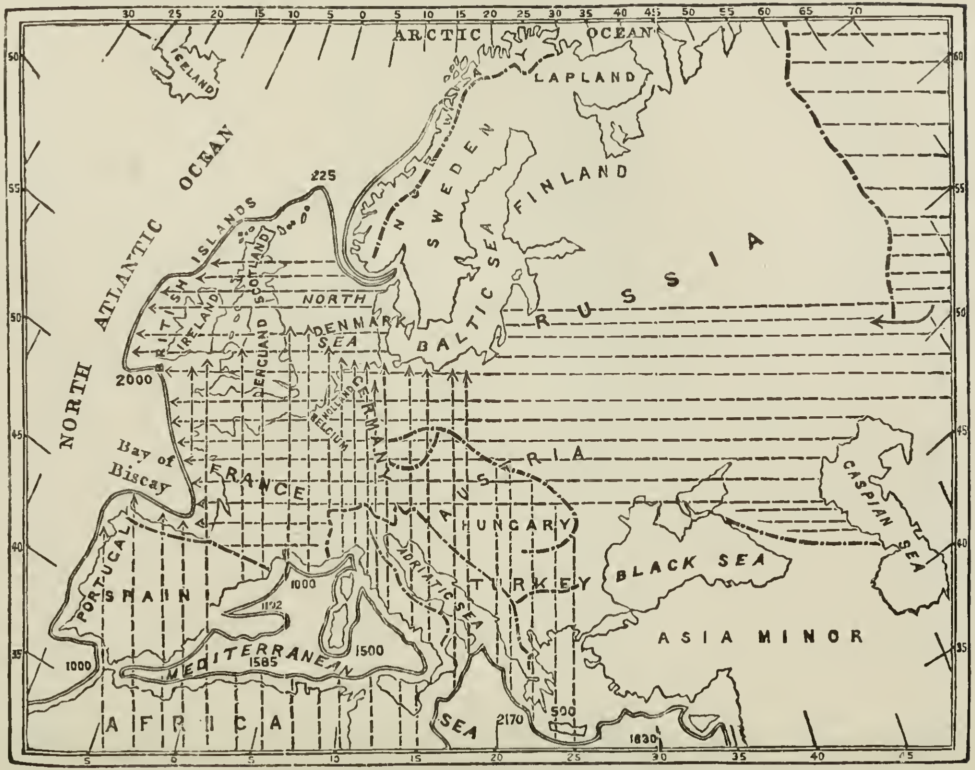


Diagram illustrating "The Geography of Britain at the Time of the Arrival of Man."
By Sir W. Boyd Dawkins, D.Sc., F.R.S.

The Journal
OF THE
Manchester Geographical Society.

* * *

# THE GEOGRAPHY OF BRITAIN AT THE TIME OF THE ARRIVAL OF MAN.

By Sir W. Boyd Dawkins, D.Sc., F.R.S.

(Delivered to the Society on January 6th 1920.)

Before entering upon my address, it must be realised that the main geographical features of the earth are the result of a series of changes brought about in remote geological times. The geography that I have to lay before you relates to the time when Britain formed part of the Continent, and when man first appeared in Europe. It is based partly on the range of the animals inhabiting the land and partly on the distribution of their remains at the bottom of the existing seas, in the North Sea and in the British Channel.

As we may expect from the laws of evolution the earliest types of man are those which are more or less linked to the higher apes and are no longer represented in the existing races of mankind. The two earliest types hitherto discovered are represented by a lower jaw found along with the extinct animals at Mauer, near Heidelburg, and by the famous Piltdown skull (Eoanthropus) found in the river gravels near Lewes in Sussex. Both are closely allied to the chimpanzee, and the latter belonged to a man of high capacity though still bearing in its form ample evidence of derivation from an ape-like ancestor. The third primitive type of mankind, like the preceding, allied with the apes, and found originally in the cave of Neanderthal, near Düsseldorf, has been discovered in the caves of Belgium, France and Gibraltar, associated with the rude paleolithic implements so commonly found in the river deposits of those districts. All these are clearly shown by the associated river drift implements to have belonged to paleolithic hunters of the wild animals inhabiting Europe in the pleistocene period. They present no traces of the higher culture and especially none of the artistic development of the cavemen who succeeded them in Britain, Germany, France and Spain, and who lived on the same wild animals as their predecessors.

The cave-man forms the fourth group, differing from the other three in the fact that he has lost their ape-like characters, and is indistinguishable from modern man in his physique or in his brain power. He is conspicuous for his capacity for depicting in outline, in colour, and in the round, the animals which he hunted.

From the illustrations on the screen, taken from the frescoes in the caves of France and Spain, and from the implements found in those countries and in Britain, you can see for yourselves the surprising art of the cave-men. They represented the animals they hunted with extraordinary accuracy. In one sketch for example, a horse is seen at full gallop. In another it is in the act of neighing, while in a third is a mob of horses wheeling round headed by its leader, as may be seen any day on Exmoor when the half-wild ponies are startled. In others the reindeer is seen grazing, or a herd is represented by a forest of antlers after the impressionist style. In one fresco a procession of mammoths adorns the side of a cave. In others a woolly rhinoceros or a herd of bison—all done in colour, either red, yellow or black. There are also alto-relievos on stone of horses and men and women. In one cave, by a singular chance, two well modelled clay figures of bison have been discovered. All these show a sureness of touch and an intimate study of the animals indicating that the cave men were endowed with the same mental characters as ourselves, and with more than the average feeling for art.

I turn now to the evidence of the wild animals as to the geography of Europe during the time that these four groups of primitive hunters were the masters of the land.

The wild animals then in Europe consist of species now restricted to climates either warm, temperate or cold, and now only found in Africa, Asia and North America, and these are associated with extinct forms, the cave bear, the mammoth, the woolly rhinoceros and others, that characterise the pleistocene period in Europe and Northern Asia.

In the accompanying map the range of two only of these groups—the warm or southern and the cold or northern—is represented. We will take the southern first. The porcupine of Northern Africa and of the Mediterranean region generally at this time lived as far north as Belgium. The leopard, common to Africa and the warmer regions of Asia, ranged as far as Somerset, and through Spain and France into Saxony and Britain. The wild cat of Africa occurs in the caves of Somerset. The lion, now living only in the warm climates of Africa and southern Asia, followed its prey over the Continent, as far north as Yorkshire and as far to the north-east as Poland. The spotted hyena of Africa south of the Sahara Desert then abounded in southern and middle Europe and in Britain as far as the Tees. It also inhabited the caves of Ireland, and the caves generally on the Continent, ranging to the north-east into Asia as far as the Altai Mountains. The striped hyena of Africa and the warmer regions of Asia ranged as far as Provence, and the African elephant now no longer met with north of the Sahara Desert, passed northwards as far as Sicily, and into Spain as far as Madrid. The hippopotamus also passed northwards through Spain and Italy into Europe, and is found as far north as the caves of Yorkshire.

The invasion of Europe by these southern animals whose headquarters are in Africa proves a closer connection between the two continents than at the present time. The Straits of Gibraltar could not have been in existence when the African elephant ranged into Spain, and Malta, Sicily and Crete must then have been the highlands of a continent now submerged.

For the southern animals to have arrived at these places it is necessary that the Mediterranean area should be lifted up 400 fathoms above its present level, which would result in that sea being reduced to two land-locked seas divided from each other by the belt of land reaching from Tunis to Malta, Sicily and Calabria, as seen in the map. From this migration into Europe we may conclude that the shallower portions of the Mediterranean were then dry land, and all the islands were the higher grounds of now submerged lands.

It may further be noted that at this time the Sahara was occupied by a prolongation of the Atlantic into Africa far into the region south of the Atlas Mountains.

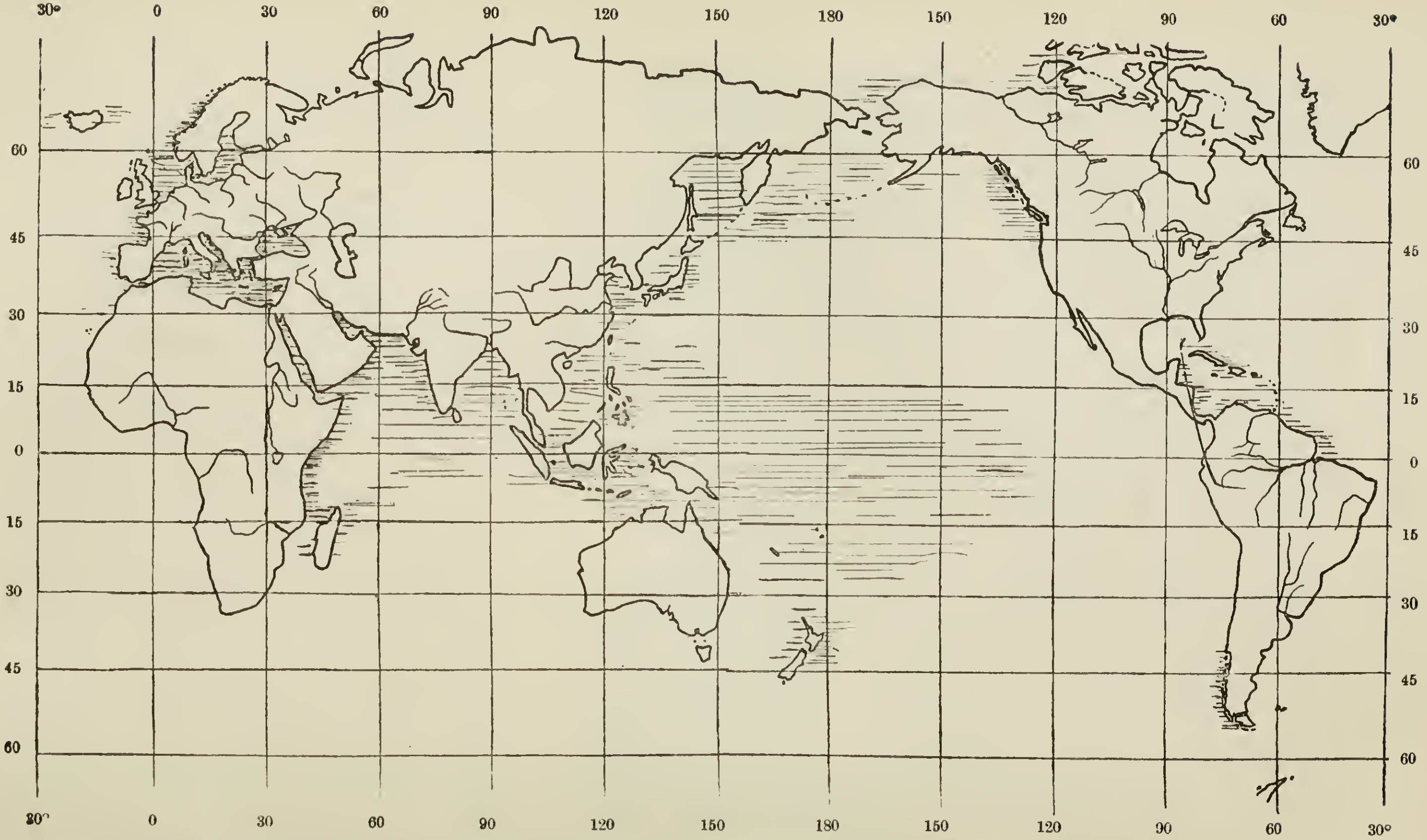
We can now consider the testimony of the wild animals of the Northern and Temperate groups as to the range of the pleistocene continent northwards and eastwards. Both these groups migrated into Europe from Asia from which they had hitherto been barred by a tract of sea extending northwards from the Caspian through the low-lying regions of Siberia to the Arctic Ocean. When this barrier was removed the migration into Europe began, and the northern or Arctic group found their way westwards and southwards (as shown on the map) to the Atlantic, and southwards to the Alps and Pyrenees. They consist of the reindeer, musk-sheep, Arctic fox and others. For their distribution in Britain and Ireland it is necessary that the British Isles should have formed part of the Continent, and an appeal to the soundings reveals that the coast line of the Atlantic, now sunk 100 fathoms below the sea-level, ran far to the west of Ireland and included all the British Isles (see map).

The North Sea was then a broad valley through which the Thames, the Humber and other of our eastern rivers joined the Rhine and the Elbe, falling ultimately into the deep fiord to the south of Norway. The rivers too of France and Britain on both sides of the British Channel then formed a great stream flowing through the prairies that united Britain with Ireland, and they may have opened on the same Atlantic estuary as the Severn to the south of Ireland. The Dee, Mersey and Clyde delivered their water into the same fiord as the Rhine—to the south of Norway.

The range of these two groups of animals not only reveals the pleistocene geography of Europe but it also throws light on the climate. From the map it will be seen that the pleistocene continent extended from the Sahara to the Atlantic, the Mediterranean being greatly reduced in size, and offering no barrier to migration from the warm southern to the cold northern regions. Consequently the climate in Europe was continental with hot summers and cold winters, in contrast to the climate of to-day, in which the extremes of temperature are modified by the increase of the area of sea in the Mediterranean, and on the side of the Atlantic, coupled with the diminution of the area of land, that have caused the climate of Britain to become insular.

In the hot pleistocene summers the southern and especially the African species could find their way northwards as far as Yorkshire, while in the winter the northern species could migrate southwards as far as the Alps and the Pyrenees, both occupying the same area in Britain and middle Europe at different seasons of the year. In this we find the only explanation of their being found lying side by side in the hyæna dens and river deposits over the whole of Europe covered by the crossing of the lines of distribution on the map. It is not, however, likely that the migrations over so great an area took place in one year. The fluctuation of the glaciers then crowning the higher grounds prove that there were secular changes of climate in pleistocene Europe, in time not to be measured by years, which would cause the limits of these migrations to vary during the immeasurable length of the pleistocene period.

The interval too between the period in question and the present day is also immeasurable in terms of years. It is to be measured by the slow sinking of the land by which the British area became insular and during which the pleistocene races of men disappeared along with the animals that they hunted, at the close of the period. After this great geographical revolution to which Europe owes its present outlines the ancestors of the European peoples of to-day come on the scene in the Neolithic, in the Bronze and in the Iron stages of culture, that form the three archæological divisions of the pre-historic period.



Sketch Map, showing coasts on which navigation developed, to illustrate paper on "Some Geographical Factors in the Evolution of Navigation," by C. B. Fawcett, B.Litt., M.S., Reader in Geography in the University of Leeds.

# SOME GEOGRAPHICAL FACTORS IN THE EVOLUTION OF NAVIGATION.

By C. B. Fawcett, B.Litt., M.Sc.,
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(Addressed to the Society in the Geographical Hall, Manchester, February 13th, 1920.)

The shipbuilding and navigation of any people in any age are only part of their general culture; and in considering it apart from the rest of that culture this fact must be borne in mind. The form and size of their ships are directly influenced by the kind and relative abundance of the materials available for shipbuilding and by the skill and knowledge obtained in other forms of construction, as well as by direct adaptation to the conditions under which the vessels are to be used. Their knowledge of navigation is similarly influenced by their knowledge of mathematics and astronomy and of winds and weather. Hence a discussion of navigation apart from general culture is necessarily incomplete. Therefore this paper does not attempt to give an exhaustive account of the evolution of man's power to make use of the seaways for his travel and the transport of his goods; it is rather an effort to state some of the principal geographical factors in this evolution.

The principal elements of the geographical environment which have directly influenced the local development of navigation in any region may be grouped under four heads:

I. The physical character of the coasts.
II. Climate.
III. The quantity and quality of the available shipbuilding material.
IV. Location.

I. A coast which contains many small areas of sheltered water in inlets and channels, with numerous visible islands which constantly tempt its inhabitants to cross the narrow straits, is likely to be a nursery of seamen. This is particularly the case if it is backed, as such coasts often are, by relatively barren highlands, with forests on their wetter sea-facing slopes, so that travel is easier on the waterways than on the rugged land surface, and the temptation to cross the water is reinforced by the repulsion of the unattractive hinterland. Where such sheltered waters contain an abundance of fish or are the haunt of other marine animals the attraction is so great that it may almost amount to compulsion, since the coast dwellers may find their chief source of food in the waters. The direct influence of such a coast is greatest in early stages of development, when vessels are small and weak and the navigators are comparatively ignorant and timid, but it remains considerable in modern times.

Such extremely favourable regions occur in the fjord coasts of north-western Europe and the corresponding coasts of the north-western and south-western extremities of the Americas, in British Columbia and Alaska in the north, and the Chilean province of Magallanes in the south. Each of these three regions is important in a study of the early stages in the evolution of navigation; but all three are in high latitudes, remote from the warm and warm-temperate zone in which the early civilisations arose, and this relatively unfavourable location handicapped their development and neutralised some part of their local advantages. Even the least remote of them, north-western Europe, developed its navigation later than that of some less favourable coasts in warmer regions.

Other favourable coasts occur round the narrow, mountain-rimmed, and island-studded Ægean Sea and the seas of the East and West Indies. The eastern part of the Mediterranean Sea, though in many ways less favourable to the earliest stages of navigation than the fjord coasts, had the decisive geographical advantage of a location close to the areas in which civilisations first developed and began to use the sea-ways; hence it was the chief area of development of ancient ships and navigation.

The most unfavourable type of coast is well exemplified by that of West Africa between 15° and 30° north latitude. Here even the people found in the Canary Islands by the first European discoverers possessed no means of navigation; and this thousand mile stretch of desert and harbourless coast, lying just to the south of the seas in which navigation developed earliest and to its highest stages, remained an effective barrier to seafarers until the beginning of the modern age.

II. The element of climate which has had the greatest and most direct influence on the earlier stages of the evolution of navigation is the wind. Under this term we include the conditions of regularity, force and frequency of the ordinary winds and the extent to which the region concerned is subject to storms and spells of calm. Before the introduction of steam-driven ships wind was the chief motive power used on the seas except in two cases—(1) where the people had not yet learned the use of sails, and (2) in areas of frequent and long-continuing calms, in which the oar-driven ship remained in use well into the nineteenth century. For thousands of years the main line of development of shipping was that of increasing skill in making use of the winds.

III. The distribution of forests is mainly a result of climatic factors, and hence its influence on ships might be regarded as a part of that of climate; but it is of sufficient importance to warrant separate consideration. Before the middle of the nineteenth century wood was almost everywhere the chief material used in the construction of vessels; hence the size of the tree trunks and the quality of the timber available very strongly influenced the type of ship which was built, and therefore to some extent affected the methods of navigation. This is perhaps best shown by the relative distribution and development of the dug-out and built-up types of vessels among primitive navigators.

From the floating log or branch, which may have been at first only an aid to his own powers of swimming, there were two obvious ways of advance open to primitive man in his endeavours to cross or travel on a river. One was the search for a more convenient log and the shaping and hollowing of it to suit his needs as far as possible, with the tools at his disposal. A solid log, merely pointed at the ends, has been found in use as a canoe on the Australian coasts, while the further stage of the shaped and hollowed log, the dug-out canoe, was reached in many parts of the earth. The hollowed log was the direct, though distant, precursor of the highly-developed dug-outs of the north-western Amerinds.

The second method of improving on the floating log was by building up instead of cutting out. Two or more logs tied together would give greater carrying power and stability than one; and where logs were scarce or small and cutting tools inadequate this would often be the easier way of making a boat. A primitive boat of this type was a bundle of reeds tied together in a roll large enough to uphold a man in the water. A very early form developed from this was the reed canoe of the Tasmanian aborigines, formed by tying several such bundles together in a shape approximating to that of a boat, with a slight hollow in the upper surface for the occupants. That this was a natural and simple step taken very early in the evolution of boats is indicated by the occurrence of such reed canoes in areas as far apart as the Nile and Tasmania, and California and Lake Titicaca. From this reed boat the hide boats of the Nile and Euphrates, and some steppelands, could be derived by the addition of a covering of skins to make it watertight and the subsequent removal of most of the reds, as they were found to be unnecessary, leaving only a framework to keep the cover in shape.

Of these two primitive types of vessel the built-up boat allowed of the greater freedom in choice of materials and in its form and size; and therefore it contained the greater possibilities of further development. The dug-out could not advance beyond the limits of size fixed by that of the largest available logs, and its narrowness and rounded bottom made it a very unstable vessel under most conditions, while wood was the only possible material for it. The built-up boat, even in its early forms, shows a considable variety of materials, including reeds, logs, wickerwork in the coracle, skins, bark and planks. All these, but especially the last, permit of great variations in the shape and size of the boats and in the methods of construction, and from them all our modern ships are derived. The only limit to the size of the built-up ship is fixed by the point at which she becomes too unwieldy for the powers of the men who control her.

The dug-out canoe was the characteristic vessel of densely forested lands. It occurs in the East Indies, whence it may have spread to north-western America and the Pacific Isles, and on the rivers of Central Africa and South America. The built-up vessel, on the other hand, was, in its very early stages, generally characteristic of regions where trees are few, or the people so ill-equipped as to be unable to cut them down to obtain large logs. The reed and hide boats of Egypt and Babylonia and the bark canoe of the Yahgan are instances.

IV. The last of our four main geographical elements—that of location—has been of prime importance; since the relative accessibility of an otherwise favourable coast largely determined the extent to which its inhabitants came into contact with and received stimulus from peoples of other regions. In the evolution of navigation access by passable waterways to civilised lands and contact among different navigators gave great advantages to the peoples of the European and Indian Seas. (See map.) A zone of more or less sheltered waterways, with many favourable coasts, extends right across the great land mass of the Old World from the marginal seas of north-western Europe by way of the Mediterranean and the Red Sea or the Persian Gulf, to the Indian and China Seas. Thence it is continued north-eastward by the marginal seas and islands of the North Pacific to the north-west coast of North America; it is also continued eastwards among the East India Islands to the neighbourhood of Australia and the islets of the Pacific Ocean. This belt of coastal waterways extended by many navigable rivers, stretches for more than half way round the world and fringes the whole length of the western, southern and eastern shores of Eurasia. Differences of climate and the presence of land barriers divide it into four fairly well-marked regions, of differing extents, which we may call the North Sea, Mediterranean, Monsoon and North Pacific regions respectively, among which the physical conditions vary considerably. But these differences did not prevent a drift of intercourse sufficient for the spread of a common early culture, so that development in any one part of this zone was aided by that in other parts.

Between the Mediterranean and Monsoon Regions this maritime zone is crossed by the land zone of warm temperature and tropical arid regions in which riverine oases civilisation first developed. And here, where the rivers of Egypt and Mesopotamia flow to island seas, we find the beginnings of systematic navigation.

To the north of this zone of navigable waters the continuous land mass and the ice of the Arctic seas prevented any corresponding developments. Elsewhere long stretches of unfavourable coasts and wide expanses of ocean isolated the greater part of the Americas and the southern extremities of the continents, which are humanly speaking the real "ends of the earth," from this great zone of maritime intercourse.

The southern and western shores of Africa are altogether unfavourable to local maritime developments, and none took place there. Off southern Australia and Tasmania the physical conditons are less inimical than those off the unbroken coast of South Africa, but the very low cultural development of the aborigines, due in great part to the poverty of the Australian flora and fauna, prevented any serious maritime activity in that region.

In the Americas there are two regions in which local maritime developments could, and did, occur. There is, first, the American Mediterranean, the island seas of the West Indies and Central America, where the Caribs, spreading by canoe from the great rivers of South America, were establishing themselves at the time of their discovery. And, second, there is the remote fjordland of Magallanes, a very favourable coast except for the extreme isolation which forbad for its peoples stimulus of contact with other navigators at any comparable stage of development, or even that of contact with any higher culture by land. Except for occasional brief visits by explorers and traders Magallanes was unknown to the civilised world till the latter part of the nineteenth century; but the primitive culture of its peoples is perhaps better known to us than that of any other people at a corresponding stage of development, owing to the good fortune of its having been studied by members of the 'Mission Scientifique du Cap Horn' in 1882–3 before it was destroyed by contact with European settlers. Hence we may begin a survey of the development of navigation in some distinctive regions by a brief sketch of that of these peoples.

Northward from the fjord coast of Magallanes, on the western side of the Americas, the longest stretch of almost unbroken coastline on the earth stretches, through nearly 90° of latitude, for more than 6,000 miles beside the widest of the oceans; and for a thousand miles of this length, in northern Chile and Peru, it is a desert coast. The eastern shore of South America is also that of an arid region for some ten degrees northward from Magallan Straits, with few offshore islands or sheltered inlets. Hence Magallanes is the most isolated of all coasts favourable to the development of seafaring, and until the period of trans-oceanic voyages it does not appear to have had any maritime connection with any other region. All the native peoples of the southern part of

South America, south of the Inca dominions and the La Plata, were found in the hunting stages of social development, and only in the extreme south-west was there any development of navigation among them. The rest were land hunters who made no use of the very few waterways of this part of the continent. Hence it is almost certain that the ancestors of the Yahgan people, whom the discoverers found in occupation of the fjordland, were landsmen and hence that their maritime culture was a local development which owed nothing to the direct example or influence of any other people; though it is possible that some tradition of canoes may have survived from the time before their remoter ancestors were driven from the river valleys north of the La Plata.

When the first of these landsmen entered the fjord land, probably as refugees, they experienced a complete change of environment. They passed from dry, open, grassy plains to wet, densely forested mountain slopes intersected by innumerable inlets and channels of a stormy sea. Land animals such as those on which they had formerly subsisted were very scarce here and land travel was very arduous. On the other hand, the sea offered a comparatively abundant supply of food—'shell-fish' abounded on the foreshore and in the shallow waters: the seaweed, which grows densely along these shores, furnished food for countless myriads of small animals, and this abundant food supply drew to the shores vast numbers of many kinds of fish and sea-mammals. Most of the early visitors were greatly impressed by the abundance of aquatic life and the relative poverty of the land fauna.

These conditions compelled the Yahgan to become a seaman; since the collection of his food supply demanded the use of a boat which would enable him to pass freely about the sheltered channels. The tools of these primitive hunters seem very inadequate for boat-building. Their general culture was probably much inferior to that of neolithic man in Western Europe, and they had only shell knives, bone prickers, and unshaped stones as available working tools. With such tools in so wet a region it was impossible for them to cut down a tree, or work any considerable log, and hence the available material consisted of the bark and smaller branches of the trees and the skins and tendons of animals. The canoe was made of pieces of bark fitted to a framework of carved branches and sewn together. It was a clumsy and very fragile vessel, which needed constant repairs; and, even though its owners took great care of it, the average life of such a canoe did not exceed six months. The canoe was driven along by simple paddles. Oars could not have been used on so frail a vessel, even if the people had known their advantages. Soon after their contact with European ships some of the Yahgans were found to hold up pieces of sealskin or fix up a temporary mast and sail when the wind was favourable, an evidence that they were ready to adopt improvements which were at once practicable and useful and within their comprehension.

Such a canoe was an exceedingly frail vessel in which to traverse the fjords and channels of one of the stormiest coasts of the world. It was perhaps the least efficient craft used by any people who spent a large part of their lives on the water. But when it is remembered that it was constructed by a people at so low a stage of cultural development, without experience or examples or models to aid them, it must be regarded as a considerable achievement of that invention which is the child of necessity and to which so much of human progress is due.

At the other end of the Pacific coast of the Americas the fjord coast of British Columbia and South-eastern Alaska offered an environment even more favourable to the development of a native navigation than that of Magallanes. Here the "Inland Passage" gives a thousand miles of sheltered waterway between the island fringe and the mainland, along a deeply indented coast. The natural wealth of the sea and river fisheries offered so abundant a food supply that the peoples who were found here by the first European explorers, towards the latter part of the eighteenth century, had attained to a complexity of social organisation and a density of population which almost deserved to be termed a civilisation—the only development of this kind which was not based on agriculture. As this cultural development was based on a food supply drawn from the waters and the people were distributed along an island chain and an indented coast their culture was an essential part of it.

This North-west American coastland is not an isolated region. (See map.) It is the easternmost section of the great belt of early maritime intercourse which stretched two-thirds of the way round the world; and it was therefore exposed to maritime influences from the west. It is on the route of the primæval migrations by which the Americas were peopled, especially for those migrants who used the waterways and drifted along the islanded fringe of the North Pacific. There was, however, sufficient isolation for this region to develop a distinct native culture in response to its distinctive local conditions.

These people had better tools and organisation than those of the Yahgan. Copper was known and prized for ornamental purposes before Europeans reached the region; though it does not seem to have been used for tools. The chief cutting tool was a clam shell fixed to a handle of wood or bone: stone axes and hammers were also in use, and fire was an important auxiliary in their canoe building. The canoes were dug-outs, *i.e.*, each was made by hollowing out a single log, not by fastening together different pieces of material. These peoples were, naturally, the most advanced people who used the dug-out; and the region in which they lived is that of 'big' trees, the western coniferous forest of North America. The size of the logs at their disposal enabled them to construct very large canoes, the largest of which could carry from sixty to a hundred men. This very facility in making such large vessels may well explain why they did not make the transition to built-up boats. They carried the dug-out to what was probably its highest development, and their best vessels seem to have been nowise inferior in size and general efficiency to the built ships of North Sea navigators before the Viking period, except that they used only paddles; but the limitation to the dug-out kept their maritime culture in a blind alley: it was incapable of much further progress without a complete change in the principles and methods of construction, a change which was not likely to be made apart from external pressure.

Egypt was one of the earliest homes of civilisation. It is a riverine oasis in the tropical desert belt, situated near the strategic centre of the great mid-world waterways, within easy reach of the Mediterranean and the Red Seas, and so able to send its ships out in both directions and to control the shortest land route between the Mediterranean and Monsoon Regions. Hence the developments of ships and navigation in Ancient Egypt was so placed as to exert great influence on the shipping of the important maritime peoples of the Ancient World, and they are therefore of special importance in such a study as this.

The chief local factors influencing the early development of navigation in Egypt were:—

(1) The distribution of the habitable land in a long and very narrow strip with the river as its axis. Hence the river was the highway of the country, and all effective organisation depended on the use of this highway; so that boats were a vital necessity to Egyptian culture from its beginnings.

(2) The fact that Egypt is in the zone of tropical deserts; and hence that storms or any strong winds are rare.

(3) The ease of movement along the river afforded by (*a*) the down-stream current, and (*b*) the contrary Etesian winds, which, particularly in winter, blow regularly up the confined valley and so enable very simple sailing vessels to move up-stream.

(4) The shortage of timber consequent on a desert climate. As soon as the land was so far occupied that none of the flooded land was uncultivated forests must have disappeared. This shortage forbad the development of the dug-out canoe and compelled concentration on the construction of built-up vessels.

The conditions under which Egyptian ships were slowly developed were very different from those in the two fjord lands to which we have already referred. There primitive peoples were forced on to the waterways in the unceasing quest for food, and the life of most of the men was spent largely on the water. Here the food supply was produced by a laborious system of agriculture, and shipping was a secondary activity employing the energies of only a small part of the population, but essential to their organised life because of the need for communication and therefore supported by the organised power of the State.

Two of the fundamental inventions in the art of navigation may probably be ascribed to the Egyptians—(1) the change from paddling to rowing, which resulted in an enormous gain in power, and (2) the introduction of the sail to harness a favouring wind to the task of driving the vessel along. Whether the credit for these inventions is wholly due to the Ancient Egyptians or not it is clear that the earliest evidence of them is from Egyptian tombs and records. The sail was of a simple type, and it seems probable that there was no knowledge of tacking against a contrary wind—a process which was not likely to be developed under the conditions of river navigation.

The passage from the riverine navigation of the early civilisations to sea voyaging was made, so far as western civilisation is concerned, round the eastern Mediterranean. The Persian Gulf, the inland sea to which the rivers of Mesopotamia flow, is comparatively small, and is surrounded by arid coasts, so that it offered little variety for development and few attractions to the trader or adventurer. The Mediterranean, in contrast, is one of the largest of inland seas, stretching for more than 2,000 miles, from Syria to Gibraltar, and covering an area of nearly a million square miles. Away from the desert table-land which forms the eastern half of its southern shores the coasts are usually mountainous, and hence there are many valleys opening out to the sea and separated from each other by mountain areas, so that their easiest communication with each other is by water. Where the mountain belt has undergone a partial submergence the coast is very much indented, with numerous islands and sheltered inlets to favour seafaring : along the Dalmatian coast and in the Ægean Sea these conditions give two areas highly favourable to the growth of a seafaring population.

In its climatic condition also the eastern Mediterranean was a favourable area for the transition from river to sea navigation. It lies between 30° and 40° N. latitude ; in summer it is mostly within the belt of the tropical calms and has generally calm weather with only local and occasional breezes ; in winter it is at the southernmost edge of the belt of the westerly variables, and hence has light and variable winds. Storms are comparatively rare, and fog is almost unknown over most of its area. The rowing boats used on the Nile could pass out on to the sea without any important change in either structure or methods of progression. The sea was almost as smooth and free from waves as the rivers, and this fact, combined with the general lightness of the winds and frequency of calms, made the oar-driven galley the dominant vessel on this sheltered sea. Throughout the centuries in which western civilisation was focussed round the Mediterranean Sea the galley, essentially dependent on its oars and using sails only as an auxiliary means of progression, was the highest type of vessel ; and the limitations of the galley decided the limits of sea transport and to a large extent the range of the Mediterranean civilisation.

Among the limitations inherent in this type of vessel we may note—

1. The very low freeboard necessitated by the fact that the oar could not be mounted high above the water. This made the galley liable to be swamped when waves ran high and hence relatively unseaworthy. It was in most cases only a fair weather craft.

2. The large numbers of the crew required. This was so large in proportion to the size of the vessel that, except in the case of very slow merchantmen, a galley could rarely carry sufficient men to keep going throughout the twenty-four hours. Hence the galley was generally unable to depart from the ancient custom of stopping every night: and except in very calm weather the nightly stop must be either in a sheltered inlet or on a shore where the boat could be hauled out of the water. Thus in practice the galley was limited to coasting voyages or short sea traverses.

3. The numbers required to work the oars also reduced very considerably the carrying capacity of the vessel; and the large quantity of provisions and water needed if the voyage was likely to take them any considerable distance from a source of supplies further reduced the capacity of a galley for any long continuance journey.

4. Lastly, the galley was almost inevitably a slave ship. Few types of labour better adapted to the conditions of slave work can have existed or been in large demand at any period, while the laborious and monotonous character of the work must have made it repugnant to free men. The work was arduous, but needed little intelligence or adaptability, so that it could be done effectively under compulsion. It was gang labour, so that few supervisors were needed, and the slave, chained to the bench, had no chance of escape and was within reach of the overseer's lash. The intimate association of the galley with slavery lasted as long as the galley was an important means of sea transport; and this association condemned the seafaring peoples of the ancient Mediterranean world to rest a large part of their civilisation on a basis of slave labour.

The seafaring of the Monsoon Region has not contributed greatly to the development of modern navigation; and hence we cannot afford to spend much time on it. The distinctive condition of these seas is the prevalence of the light regular breeze, alternating with the seasons, which we know as the monsoon wind. Storms are almost confined to the period of the change of the monsoon; and since they are so limited they could be evaded by the simple process of staying in harbour at this time; hence the monsoon sailor was not compelled to adapt his vessel and his seamanship to weather the storms. The regular alternation of wind direction, and the even flow of the light breeze, made it easy for very simple sailing craft to run before the wind and so to cross the sea; while it did not demand any adjustments of sails and yards to varying directions and strengths of wind and the development of tacking; to return against an opposing monsoon would have been extremely laborious, even for a highly-developed sailing ship, and the natural procedure was to await the change of seasons and return home with the favouring monsoon.

Under these circumstances intercourse across the monsoon seas was developed at a comparatively early period. Chinese and Hindus reached the East Indies by the fifth and sixth centuries of our era; somewhat later Malay seamen ranged far and wide over the monsoon seas; and in the Middle Ages the Arabs built up in this region a great sea power which was only destroyed when European navigators reached the Indian Seas. But all these were limited to the seas over which the monsoon winds blow. They ranged from East Africa to Japan, but did not sail into the belts of the variable winds, to the more difficult conditions of which neither their ships nor their seamanship was readily adaptable, while the character of the coasts at the limits of their range was not such as to tempt them to further exploration.

The North Sea Region differs from the Mediterranean in many respects. Except in Norway and Scotland it is bordered by lowlands, and the high range of its tides gives it wide expanses of foreshore and long tidal estuaries at the mouths of most of its rivers, so that the transition from river to sea is very gradual. These rivers also are generally navigable, at least for small craft, for considerable distances, and flow through regions which were formerly forest covered so that timber for ships was abundant. The smaller size of the trees forbad any development of dug-out vessels comparable to that of the north-western Amerinds, and this fact, probably aided by influences from the Mediterranean Region, led to the development of a type of vessel built up by raising the sides of a narrow dug-out until the original log became merely the keel of the ship. The use of oars rather than paddles and some knowledge of sails may also have been learned by contact with sailors of the Mediterranean Region during or before the Bronze Age.

The climate of the North Sea is a strong contrast to that of the Mediterranean in those factors which have most directly influenced modes of navigation. Calms are rare and uncertain. The winds are frequently strong and very variable in direction, and this fact combines with the high tidal range and alternating tidal currents to produce a choppy sea with high waves which is, for small boats, much more formidable than the generally smooth waters of the relatively calm and tideless Mediterranean.

The need for a higher free-board and the difficulty of rowing evenly on a tossing sea combined with the rarity of calms to guide the development of northern seamanship towards reliance on the sail rather than the oar as the chief means of propulsion. The management of a sailing ship in a region of variable winds and waves is a much more difficult problem than that of controlling a galley on a calm sea; and also the North and Baltic Seas are comparatively remote from the homes of the ancient civilisations. Hence the development of navigation in these northern waters came later than in the Mediterranean. At the beginning of the Middle Ages the northern pirates who raided the western coasts of Christendom did so in ships which had both oars and sails.* Towards the end of that period, when the Mediterranean maritime powers of Venice and Genoa, Spain and Algiers were still using galleys, with auxiliary sails, the seafaring folk round the North Sea had developed efficient seagoing ships, with an equipment of adjustable sails which enabled them to tack against opposing winds, and adapt their sails to the constant varying winds of their seas; so that when at last the oceans were crossed these peoples were in possession of the best existing ships and seamen.

The fundamental difference between the galley and the sailing ship was that the former depended on human muscles for its motive power and the latter on the wind. From this many other differences follow. The sailing ship required a much smaller crew than a galley of the same size and hence had far more of its space available for stores and cargo: it could be made much larger and therefore could undertake much longer voyages from port to port; and it was in general a more economical carrier; though it was less regular on short voyages, especially in regions of light winds or calms. In its reactions on social development we should note that the sailing vessel required from its smaller crew much varied work and that intelligent adaptation to varying conditions which has made the sailor the 'handy man.' These conditions are directly opposed to the use of slave labour which is, on any considerable scale, capable only of comparatively unintelligent and monotonous toil under uniform conditions. Thus while the galley was driven by slaves the sailing ship was manned by free men, and it aided the growth of free institutions among the peoples it served and united.

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*Cf. the Viking ship discovered at Gokstad, now in the Museum at Kristiania, of which there is a model in the South Kensington Museum.

Besides demanding the development of a different type of ship to meet the more difficult conditions of navigation in the stormier northern waters the North Sea, by its shape, imposed a need for longer sea traverses than those within the narrow and sinuous Mediterranean. When Pytheas of Massilia visited the seas of north-western Europe in the 3rd century B.C. he found seamen accustomed to voyage directly from England to Scandinavia, at a time when the Mediterranean navigators hardly dared venture out of sight of land; and the Norse seamen of the 7th, 8th and 9th centuries successfully carried out long ocean voyages as far as Iceland and Greenland, when their Mediterranean contemporaries were still almost limited to coasting voyages. These longer voyages made the problem of carrying sufficient stores of food and fresh water more urgent here than on the inland sea. The development of the wooden barrel, probably in Norway in the 12th or 13th century, provided the first reliable means of carrying fresh water, and keeping it fresh for long periods, and so was an important advance towards transoceanic navigation.

Of the three chief regions in which ships and seamanship developed to an important degree the North Sea was the one in which the difficulties to be overcome were greatest. The stormy sea with its high waves, irregular winds and rare calms was more formidable to a primitive navigator than either the regular alternation of the gentle monsoon winds or the calms and smooth seas of the Mediterranean. Hence the appearance of North Sea mariners as an important force was much later than that of those of the two easier regions. But these same factors ensured that the sailors of the northern seas developed better vessels and more capable seamanship; so that when at last the ocean barrier was broken and sailors of the various regions came into contact with each other the ships and sailors of the North Sea lands ranged the oceans from the North Pole ice to the edge of the Antarctic ice pack and nowhere found any rivals capable of disputing their supremacy on the seas. Only in areas of frequent calm was it possible for the rowing vessels to maintain their importance, as they did in the narrow island seas between Europe and the Indies, until the coming of the steamship.

The development of oceanic navigation which followed immediately on the discovery of the Americas and the ocean route to the Indies stimulated and was accompanied by parallel developments in navigation, shipbuilding and seamanship. The long maritime struggle between Spain and England was won by the smaller and, at that time, weaker nation mainly by virtue of the superior skill which enabled the small and handy English sailing ships to outsail and outmanœuvre the clumsy and unwieldy ‘ sea-castles ’ of the Spaniards. The naval architecture and the seamanship of the Spanish Empire was derived from the Mediterranean, over which sea lay the chief routes of the Monarchy; it endeavoured to adapt itself to the ocean but was there completely defeated and finally superseded by the stronger and more flexible maritime culture of the northern seas.

In modern days the change from wooden sailing ships to steel steamers has made maritime development a more intimate part of the general advance of applied science and very much lessened the relative influence of the regional conditions which counted for so much in the past. But the seaman is still something more than an engineer or mechanic who has chanced to find himself on a ship. The traditions of seafaring count for much; the geographical factors which fostered those traditions still exist; and the importance of Britain and Japan, of Norway and Greece, on the seas is evidence that the influence of the geographical factors is still a factor to be reckoned with.

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# LIFE IN CHINA AS I SAW IT.

By "Bertha Glazier" (Mrs. Frost).

(Delivered to the Society on March 16th, 1920.)

I feel rather diffident about offering my opinions on the subject of China for two reasons—(1) because I have changed my mind so much lately; for example, when I first went there I thought that I should never be able to distinguish my own servants from other peoples, they all looked so much alike, in fact I was struck only with the type; then I began to recognise individuals, and later, when I began to study them sufficiently to paint studies of them, I found almost as much variety in features as there is in our own races: variety in colour, of course, being absent, all having black hair and black eyes. Among my own children there is flaxen hair, auburn and also dark-brown. One day my Chinese boy said, very confidentially, "I think so funny, missie, you have got three children have got *three different coloured hair*," holding up three fingers to emphasise it. I was surprised to find how many Jewish types there were among the Chinese; many of the wheelbarrow coolies with the cotton cloths round their heads would make good illustrations for the Old Testament. (2) China is such an immense country and I have seen so little of it comparatively speaking, and that only concerning life in the foreign settlements. As regards the private life of the Chinese I know very little except what I have got from books. Ordinarily we do not make friends with the people; the servants are the only ones with whom we come into close contact, and we are often inclined to judge the whole nation by that one small part of it.

Much of what I say may appear to contradict what you have heard before; what I say myself may appear inconsistent, but then China itself is a land of contradictions, and this truth is realised by the newcomers. I might mention a few of the contradictions:—

(1) The people are one of the most economical on the face of the earth, they use waste products both in food and in tillage

to a wonderful extent, in fact they can feed on what most other nations would throw away; and yet in spite of this economy beginning at the bottom of the social scale there is no economy in the government.

(2) The land is full of temples and monasteries and shrines, and yet it can never be said that the people are religious. There are three religions, and the people seem to belong equally to all three on the principle, I suppose, that so long as no one knows which is the right one it is safe to propitiate all the gods and attend all the temples in turn. I even found one large monastery in which, I was told, most of the priests were sustaining members of the Y.M.C.A. This does not mean that they were Christians, but that they took an intelligent interest in the Y.M.C.A. literature; they were certainly the cleanest and most intelligent-looking priests I saw.

(3) The amount of money originally expended in the temples and bridges, and yet in most cases nobody seems willing to spend a cent in repairs; for instance, there are bridges, apparently miles away from anywhere, with beautiful decorations carved in stone. One wonders if the decoration was the natural outlet of artistic feeling on the part of the builders or does the bridge mark some ancient royal pilgrimage. Anyhow the bridges are falling to pieces and little or nothing is done to repair them. I can give you two reasons, and you can adopt the one you think most likely: (1) The dragon inside the bridge is stretching himself and it would annoy him very much if he were restrained, he would only stretch himself again, and the next time he might do more damage; the second reason is that when a bridge breaks it should be repaired by the person who broke it, that is if he survived the accident, failing that, by the next person who wished to use it, but as it would obviously take less time to go round by the next bridge than to repair the broken one nothing is done!

(4) There are no hedges or walls round the fields and orchards in many districts, which seems to indicate that very little thieving is done, and yet every Chinese house is to all intents and purposes a walled city. It may accommodate several families, or rather branches of the same family, but it has only one door and perhaps two barred windows, sometimes none, opening to the outside, all the other windows opening on to the inner courtyard.

(5) A quality which is rather difficult to describe : I might call it affection for, or faithfulness to, or confidence in the master for whom the Chinese works, and yet when an anti-foreign wave sweeps over the country that feeling does not prevent him from joining in the general cry, "Down with the foreigners," only with one reservation, "Down with all foreigners except *my* master and his family." We had a typical instance of this during the Plague Riots in Shanghai. The health authorities were trying to introduce some new measures for the protection of residents. When you consider that there are about fifty Chinese to every foreigner you will realise that any precautionary measures we may take for ourselves are almost useless unless the same are done by the Chinese. The old tale came again to life that the foreign doctors only wanted to attend to the Chinese, especially the children, so that they could take out their eyes and tongues and make medicines of them, and the whole of Shanghai was seething with excitement, and I found that my boy, a man about 40 years of age, who had been in foreign service for about twenty years, shared in the popular bitterness. I said to him, "Boy, how can you believe such foolish tales? Whenever you or any of the other servants are ill you come to me for medicine which always makes you better. These foreign doctors are much cleverer than I am and can do you much more good." He replied, "Oh, yes, Missie, we know you, you are very clever and very good and your medicine is very good, but *you* don't know these doctors, but everybody outside knows that they are very wicked men.

(6) Although the Chinese are so easily panic-stricken and credulous, even a hungry mob shows an amount of self-control which is surprising. During the last winter I spent in Shanghai the Tramway Company made some new regulations by which the ricksha coolies felt that they were being deprived of a part of their living. An excited mob of several hundred men assembled with the idea of wrecking a tram which happened to be carrying mostly school-children. *All* the passengers were allowed to get out and take refuge in an adjoining garden before any damage was done to the tram, and then every scrap of glass was broken, but none of the passengers was even scratched by the flying glass. Don't you think it wonderful that an uneducated mob should be able and willing to distinguish between the people who *use* the trams and those who *own* them?

Although I could give you innumerable other instances, I think I have shown you enough contradictions to convince you that I shall be very consistent if I appear to contradict myself.

The word foreigner generally means an American or European. We speak of three peoples in the East—Chinese, Japanese and foreigners.

Whether one is interested in missions or not one cannot help feeling that the religions in China are picturesque. I should like to quote Mrs. Archibald Little's remarks about one of the missions in Foochow:—"This mission adapts Chinese buildings to its requirements, instead of insisting upon forcing the architecture of an English conventicle and lodging house or even church together with the beautiful Gospel which originally came to us from the beauty-loving East, upon the great Chinese nation to whom decorative design is so much a matter of necessity that hardly the meanest cottager builds without it. Mission work has so often repelled me by its intense ugliness that it was quite a relief to find it as pretty as heathenism at Foochow, and far more pleasing from being cleanly and in good order." I quite agree with Mrs. Little, but it is not only in the missions that foreigners put up ugly buildings.

It is exceedingly dfficult to get accurate information from the Chinese. Arthur Smith, in his "Chinese Characteristics," says:—"The ordinary speech of the Chinese is so full of insincerity which yet does not rise to the dignity of falsehood that it is very difficult to learn the truth in almost any case. In China it is literally true that a fact is the hardest thing in the world to get. One never feels sure that he has been told the whole of anything." As an instance of my difficulty in getting correct information I might mention the curvature of the roofs. The general impression in the East is that it is a protection from evil spirits which surround us constantly in the air. They settle on the roof, and, sliding down, are shot off up again into space, and thus never get down to the doors. Since I came to England I have heard that curving roofs are a survival of the tent origin. To me, it seems that both may be true, and the roof decorations bear a certain resemblance to the grotesque monsters seen in our own gargoyles.

Chinese architecture may be divided into four classes: (1) temples, (2) gardens, (3) bridges, (4) dwellings.

*The temples* always have a very beautiful spirit wall opposite and parallel to the main entrance, the idea being that as evil spirits can only fly in a straight line this wall will effectually prevent any of them from entering by the door. The first building of a Buddhist temple is generally little more than an ornamental, covered gateway, with one or two small gods inside, leading to the first courtyard, at the far end of which is a larger building containing an image of the laughing Buddha with four attendant gods—two on each side. Then follows another courtyard with open galleries on each side, sometimes containing shrines and minor gods, and an incense burner in the middle. At the far end is the main temple, the largest building, containing images of Buddha and his two companions in the centre (sometimes spoken of as the three Buddhas—past present and future) surrounded by his eighteen disciples. The Confucian temples are very similar in construction but they have no images. A tablet to the memory of Confucius always stands in the main building in a very elaborate altar. The temples always appear gloomy at first because they have no windows; they are lighted only by the doorways, which are comparatively low; thus it is practically all reflected light inside, reflected from the floor. The board or boards above the altar, bearing quotations from the classics in large gilt characters are cleverly placed at such an angle that they get the full value of the reflected light. A hollow wooden fish with a slot in the back is suspended from a stand. This is to receive the people's offerings, as a fish is a sign of plenty. There are always elaborate gongs and bells and drums with which to call the attention of the god to the fact that one wishes to speak to him. The bells are often of so great a size that they have to be struck with horizontal logs of wood, suspended from the beams by two ropes, and are most musical in tone. There is very little floor space in a temple; it is not built for a congregation but rather for strings of pilgrims to pass through. The guild-houses, belonging to guilds like our guilds of the Middle Ages, are similar in plan and construction to the temples, but in addition to one or two gilt altars, have chairs and tables inside and wonderfully interesting lamps and lanterns hanging from the roof.

*Gardens.* The whitewashed wall is often surmounted by a dragon with the head at one end and the tail at the other and all the irregular undulations of the body between, with the spikes sticking straight up, altogether giving a very interesting skyline and protecting the garden—a great improvement on broken glass on the top of a wall and just as effective. Inside may not be large, but an appearance of space is provided by the rockwork (supposed to resemble rocks worn by the action of the waves) with tunnels giving unexpected peeps of the garden, and steps to the tea-houses perched as high up as possible, and by the pools of water crossed by zig-zag bridges. There are generally open galleries somewhat like our cloisters, but they are as much a shelter from the sun as from the rain. The walks are decorated with very rough mosaic patterns made from broken crockery of various colours and a background of broken gray tiles. A design in common red plant-pot gives an agreeable splash of colour on the gray walk.

*Bridges.* The most wonderful bridge I have seen is at Foochow. It looks like a bridge of boats. It was built of stone 900 years ago, and some of the horizontal pieces of stone spanning the waterways are 40 ft. long. The engineers of 900 years ago did very well to build a bridge which could withstand for so long the floods to which most large Chinese rivers are subject. Wherever one goes, in the country or in the cities, one comes across beautiful examples either with one arch or three and with carved balustrades. It is quite an adventure crossing these bridges, with their uneven steps, either on donkeys or in chairs. Personally I feel much safer when I am walking.

*Dwellings.* They are mostly one storey, and have an open courtyard in the middle, surrounded by the living rooms, each of which opens into the next one and into the courtyard. In Peking most of the foreigners live in Chinese houses, which are very picturesque. In most of the other foreign settlements the houses are built specially for foreigners, somewhat like the houses here, but adapted to the hot climate, with plenty of verandah space.

There are different ways of disposing of the dead in different districts. In the neighbourhood of Shanghai the coffins, of very thick wood, are not placed underground, but are placed either on the ground or on bricks. The poorest ones are covered with a straw thatch to protect them from the weather, better ones bricked round and tiled over, giving them the appearance of small houses, while still better ones are earthed over, making quite large mounds and have trees planted at the four corners or all round. The graves are in the kitchen garden, one might almost say, the vegetables growing all round the gardener's ancestors. In the case of wealthy people it takes a long time to decide where the permanent resting place of the coffin shall be—sometimes as long as two years; and in the meantime it is taken to a kind of temporary cemetery, where there are small rooms, one coffin in each, and gardens and larger rooms to accommodate the relatives who come frequently to mourn and to minister to the departed spirits. These buildings are kept in good repair and are very beautiful.

Regarding roof curvature, there is a great difference between the north and south, the roofs of the latter having almost a semi-circular curve, while in Peking the top line of the roof has no upward curve; that is, counting from the centre to the outside. This, I think, is due to climate, the heavy snows of North China would damage the delicacy of the southern roofs. Most of the architectural decorations are in modelled cement, at which the Chinese are very clever. I have often seen them modelling on the wall itself, a much better plan than doing it in a workshop and fixing it on the wall afterwards.

Peking might be described as a city of colour. It is gorgeous in the extreme. The yellow, emerald-green or blue tiles are coated with pottery glaze, and not only the roofs are covered with them but also the tops of the walls surrounding the compounds or gardens.

The boats in China are very interesting. Each place has its own style either in shape or colour. Each boat has two eyes in order to see which way it is going. The junks look very unwieldy, and the sails are very heavy, yet the sailors seem to be able to manage them quite easily.

Now I should like to speak of the people and of some of their good points, forgetting for the time their bad ones. Mind you, I don't say that their good qualities are altogether admirable; they are like some medicines which are beneficial in small doses but poisonous in large ones. With ourselves economy in excess becomes meanness and generosity may develop into extravagance, and the best of all Chinese virtues—filial piety—is responsible for the lack of progress in the Chinese, they are content with looking backward instead of forward. *Filial piety* is rather misleading as a term, as there is no English translation which does justice to the Chinese idea. The children are what we should call very unruly; they have no idea of prompt obedience as we understand it, yet they grow up to be better men and women than we should expect from their early training, or rather lack of training. The Chinese say "the crooked tree, when it is large, will straighten itself," by which they mean that children when grown will do the things they ought to do. It sounds rather like a faint echo of Montessori, doesn't it? And yet these same unruly children are easy to manage in school. Closely allied with filial piety are *obedience to rulers and reverence for teachers*. At the top of the social scale the Chinese place teachers; next, I think, come farmers, and at the very bottom come soldiers, a despised class, because in China it is a very thin line indeed which separates the soldier from the brigand; in fact an army of soldiers may become an army of brigands any day if their pay is overdue, as often happens.

*Chinese politeness* is to be admired, in moderation that is; of course they carry it so far that it is wearisome, but then we go to the other extreme of being unnecessarily brusque. According to the Chinese it is polite to agree with everything you say, and to promise everything you ask for, although they may have no intention of fulfilling it, and if often takes very embarrassing forms. Some time ago, in one of the smaller cities the British Consul was out walking with the wife of the Vice-Consul, and some misguided people threw mud and stones at them. The Consul sent a protest to the Taotai explaining, and asking that foreigners should be protected from such insults. The Taotai had a notice pasted in prominent places in the city: "If you see the Consul walking out with the Vice-Consul's wife please do not throw stones at them." It was embarrassing for all parties concerned, and yet the Taotai had politely and literally done as he was asked.

*The patience* of the Chinese is almost a bye-word. Two of their industries may be cited as examples of it—rice growing and the cultivation of silkworms. Most Chinese are *artistic*. Even a coolie fresh from the fields would manage to decorate a dinner-table, although he would be sorely puzzled by the amount and variety of cutlery and glass we use. A favourite and ingenious method of decorating is pattern made with coloured sawdust, trickled through a small hole in a bag, either conventional patterns or sprays of flowers or landscapes.

It is rarely necessary to go to a confectioner's for fancy cakes, one's own cook can generally turn out quite elaborately decorated edibles. Unfortunately, zeal sometimes runs away with the cook, and then a sense of humour is the only thing to save the situation. A friend's cook was told to make a cake on Empire Day bearing the words "God save the King." A few weeks afterwards he was told to make an extra nice cake as it was the "Missie's" birthday. Imagine her astonishment when a beautiful cake was proudly carried in by the boy and set before her guests, and on the top of it in very legible letters was: "God save the Missie."

*Responsibility.* Every member of a Chinese family is responsible for every other member. People are held responsible for the behaviour of other people in the same street. This idea is carried so far that if a person dies on *your* property *you* are held responsible for his funeral expenses. This creates a difficulty for the medical missions. So many cases are brought into the hospitals too late, and if the authorities once started paying for funerals there would be no end to it, and if they refused to pay what was claimed there would be unpleasantness. Therefore the authorities protect themselves by getting the relatives of a patient to sign a paper saying they will not claim funeral expenses in case of death. A few years ago a woman was taken into hospital suffering from dropsy, her body swollen to an abnormal size. The doctors said they could not save her life, but by operating her could relieve her considerably. The relatives agreed and signed the usual papers. The operation was successful, pints of fluid were taken away and the woman lived for about a month in comparative comfort. After her death the relatives paid a formal call at the hospital and thanked the nurses and doctors for what they had done to give the deceased a peaceful end; but most of all for reducing her size so much, because, according to Chinese custom, she had, several years previously bought a coffin, and if she had remained so swollen with disease she could not have used it!

The Chinese are very good at making the best of everything, "maskee," meaning "it can't be helped," being one of the commonest words in the East; in fact, some people look on the word as being absolutely wicked, so full of fatalism that one is tempted to give up trying. As an extreme instance of this there is the case of the woman in the country gathering firewood. She was attacked and killed by a tiger. Soon her husband appeared and drove away the tiger. Then he poisoned the flesh of his wife and retired for a time. When he returned he found the tiger dead near to his wife. He skinned the tiger and sold the skin for so much money that he was able to give his wife quite a good funeral and also to buy a new wife, much younger and more attractive than the old one!

I think it is Ruskin who says that in looking at a pool of water you can always see either the reflection of the heavens or the mud at the bottom, it all depends on your point of view. In studying the Chinese I have chosen to ignore the mud.

The foregoing address was illustrated in a most interesting manner by an exhibition of over 200 water-colour drawings executed by Mrs. Frost, during her twelve years residence in China.

## Review.

"Ordnance Survey Maps: Their Meaning and Use." By M. I. Newbigin. Edinburgh: W. and A. K. Johnston. Second edition, 1920, 2/- net.

The fact that this little book has reached a second edition shows that it is appreciated by the public, a fact which may be largely due to that increase of the "map" habit of mind which is noticeable at present. The revision of the book has enabled the author to correct a few slips, and to bring the references to O.S. publications up to date; it is remarkably free from misprints—on which the author and publishers are to be congratulated—though on p. 74 we have Suliven for Suilven. Part I consists of a discussion of some of the difficulties of map reading and hints on methods of acquiring that useful art. These are set out for the non-technical reader; but if there is a geographer who has not yet studied this little book he also will find in it much to help him towards that facility in map reading which is to the geographer what reading and writing are to the student of literature; while the teacher can find many suggestions on how to avoid killing the human boy's interest in maps while teaching him to read them. The rest of the book is devoted to an application of the methods indicated to eight sheets of the one-inch O.S. map, chosen so as to illustrate the more important surface features of Great Britain. They are well chosen for the purpose, and in whatever part of the island the reader may be he will find here illustrations directly applicable to his own "home district." The book can be safely recommended to all who have occasion to use our O.S. maps; and, since a study of a local map is the best introduction to map reading in general, to all who use maps and wish to use them to the best advantage.

C. B. F.

# ADDRESS TO THE GEOGRAPHICAL SECTION OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE (1920).

By John McFarlane, M.A., President of the Section

Since the last meeting of the British Association, Treaties of Peace have been signed with Austria, Hungary, Bulgaria, and Turkey; and, although there is still much which is unsettled, especially in the East, it is now possible to obtain some idea of the changes wrought on the map of Europe by the Great War. These changes are indeed of the most profound and far-reaching description. Old States have in some cases either disappeared or suffered an enormous loss of territory, and new States, with the very names of which we are but vaguely familiar, have been brought into existence. It has seemed to me, therefore, that it might not be altogether inappropriate to inquire into the principles upon which these territorial changes have been made, and to consider how far the political units affected by them possess the elements of stability. A learned but pessimistic historian to whom I confided my intention shook his head and gravely remarked, "Whatever you say on that subject will be writ in water." But the more I consider the matter the more do I feel convinced that certain features in the reconstructed Europe are of great and even of permanent value, and it is in that belief that I have ventured to disregard the warning which was given me.

In the rearrangement of European States which has taken place, geographical conditions have perhaps not always had the consideration which they deserve, but in an inquiry such as that upon which we are engaged they naturally occupy the first place. And by geographical conditions I am not thinking primarily, or even mainly, of defensive frontiers. It may be true, as Sir Thomas Holdich implies, that they alone form the true limits of a State. But if they do we ought to carry our theory to its logical conclusion and crown them with barbed-wire entanglements. Whether mankind would be happier or even safer if placed in a series of gigantic compounds I greatly doubt. It is to the land within the frontier, and not to the frontier itself, that our main consideration should be given. The factors which we have to take into account are those which enable a people to lead a common national life, to develop the economic resources of the region within which they dwell, to communicate freely with other peoples, and to provide not only for the needs of the moment, but as far as possible for those arising out of the natural increase of the population.

The principle of self-determination has likewise played an important, if not always a well-defined, part in the rearrangement of Europe. The basis upon which the new nationalities have been constituted is on the whole ethnical, though it is true that within the main ethnical divisions advantage has been taken of the further differentiation in racial characteristics arising out of differences in geographical environment, history, language, and religion. But no more striking illustration could be adduced of the strength of ethnic relationships at the present time than the union of the Czechs with the Slovaks, or of the Serbs with the Croats and the Slovenes. Economic considerations, of course, played a great part in the settlement arrived at with Germany, but on the whole less weight has been attached to them than to ethnic conditions. In cases where they have been allowed to influence the final decision the result arrived at has not always been a happy one. Nor can more be said for those cases where the motive was political or strategic. Historical claims, which have been urged mainly by Powers anxious to obtain more than that to which they are entitled on other grounds, may be regarded as the weakest of all claims to the possession of new territory.

When we come to examine the application of the principles which I have indicated to the settlement of Europe we shall, I think, find that the promise of stability is greatest in those cases where geographical and ethnical conditions are most in harmony, and least where undue weight has been given to conditions which are neither geographical nor ethnical.

The restoration of Alsace-Lorraine to France has always been treated as a foregone conclusion in the event of a successful termination of the war against Germany. From the geographical point of view, however, there are certainly objections to the inclusion of Alsace within French territory.

The true frontier of France in that region is the Vosges, not necessarily because they form the best defensive frontier, but because Alsace belongs to the Rhineland, and the possession of it brings France into a position from which trouble with Germany may arise in the future.

Nor can French claims to Alsace be justified on ethnical grounds. The population of the region contains a strong Teutonic element, as indeed does that of Northern France, and the language spoken by over 90 per cent. of the people is German. On the other hand, it must be borne in mind that during the period between the annexation of Alsace by France in the seventeenth century and its annexation by Germany in the nineteenth French policy appears to have been highly successful in winning over the sympathies of the Alsatians, just as between 1871 and 1914 German policy was no less successful in alienating them. The restoration of Alsace must therefore be defended, if at all, on the ground that its inhabitants are more attached to France than to Germany. That attachment it will be necessary for France to preserve in the future, as economic conditions are not altogether favourable. The cotton industry of Alsace may perhaps attach itself to that of France without great difficulty; but the agricultural produce of the Rhine plain will as before be likely to find its best and more convenient market in the industrial regions of Germany.

With regard to Lorraine the position is somewhat different. Physically that region belongs in the main to the country of the Paris basin, and is therefore in a sense part of France. Strategically it commands the routes which enter France from Germany between Belgium and the Vosges, and from that point of view its possession is of the utmost importance to her. Of the native population about one-third speak French, and the German element is mainly concentrated in the more densely populated districts of the north-east. But although in these various aspects Lorraine may be regarded as belonging to France in a sense which Alsace does not, the real argument for the restoration of the ceded provinces is in both cases the same. Lorraine, no less than Alsace, is French in its civilisation and in its sympathies.

From the economic point of view, however, the great deposits of iron ore in Lorraine constitute its chief attraction for France to-day, just as they appear to have constituted its chief attraction for Germany half a century ago. But the transfer of the province from Germany, which has built up a great industry on the exploitation of its mines, to France, which does not possess in sufficient abundance coal for smelting purposes, together with other arrangements of a territorial or quasi-territorial nature made partly at least in consequence of this transfer, at once raises questions as to the extent to which the economic stability of Germany is threatened. The position of that country with regard to the manufacture of iron and steel will be greatly affected, for not only does she lose, in Lorraine and the Saar, regions in which these manufactures were highly developed, but she loses in them the sources from which other manufacturing regions still left to her, notably the Ruhr, drew considerable quantities either of raw materials or of semi-manufactured goods. For example, in 1913 the Ruhr, which produced over 40 per cent. of the pig iron of the German Empire, obtained 15 per cent. of its iron ore from Lorraine, and it also obtained from there and from the Saar a large amount of pig iron for the manufacture of steel. Unless, therefore, arrangements can be made for a continued supply of these materials a number of its industrial establishments will have to be closed down.

In regard to coal, the position is also serious. We need not, perhaps, be unduly impressed by the somewhat alarmist attitude of Mr. Keynes, who estimates that on the basis of the 1913 figures Germany, as she is now constituted, will require for the pre-war efficiency of her railways and industries an annual output of 110,000,000 tons, and that instead she will have in future only 102,000,000 tons, of which 40,000,000 will be mortgaged to the Allies. In arriving at these figures Mr. Keynes has made an allowance of 18,000,000 tons for decreased production, one half of which is caused by the German miner having shortened his shift from eight and a half to seven hours per day. This is certainly a deduction which we need not take into account. Mr. Keynes also leaves out of his calculation the fact that previous to the war about 10,000,000 tons per year were sent from Upper Silesia to other parts of Germany, and there is no reason to suppose that this amount need be greatly reduced, especially in view of Article 90 of the Treaty of Versailles, which provides that " for a period of fifteen years Poland will permit the produce of the mines of Upper Silesia to be available for sale to purchasers in Germany on terms as favourable as are applicable to like products sold under similar conditions in Poland or in any other country." We have further to take into account the opportunities for economy in the use of coal, the reduction in the amount which will be required for bunkers, the possibility of renewing imports from abroad—to a very limited extent indeed, but still to some extent—and the fact that the French mines are being restored more rapidly than at one time appeared possible. (On the basis of the prodution of the first four months of 1920 Germany could already reduce her Treaty obligations to France by 1,000,000 tons per year.) Taking all these facts into account, it is probably correct to say that when Germany can restore the output of the mines left to her to the 1913 figure, she will, as regards her coal supply for industrial purposes, be in a position not very far removed from that in which she was in 1910, when her total consumption, apart from that at the mines, was about 100,000,000 tons.

The actual arrangements which have been made, it is true, are in some cases open to objection. The Saar is not geographically part of France, and its inhabitants are German by race, language, and sympathy. It is only in the economic necessities of the situation that a defence, though hardly a justification, of the annexation of the coalfield can be found. The coal from it is to be used in the main for the same purposes as before, whereas if it had been left to Germany much of it might have been diverted to other purposes. In 1913 the total production of Alsace-Lorraine and the Saar amounted to about 18,000,000 tons, while their consumption was about 14,000,000 tons. There is apparently a net gain to France of about 4,000,000 tons, but from that must be deducted the amount which the North-East of France received from this field in pre-war days. Switzerland also will probably in future continue to draw part of its supplies from the Saar.

The stipulation that Germany should for ten years pay part of her indemnities to France, Belgium, and Italy in kind also indicates an attempt to preserve the pre-war distribution of coal in Europe, though in some respects the scales seem to have been rather unfairly weighted against Germany. France, for example, requires a continuance of Westphalian coal for the metallurgical industries of Lorraine and the Saar, while Germany requires a continuance of Lorraine ore if her ironworks on the Ruhr are not to be closed down. There was therefore nothing unreasonable in the German request that she should be secured her supplies of the latter commodity. Indeed, it would have been to the advantage of both countries if a clause similar to Article 90, which I have already quoted, had been inserted in the Treaty. It is true that temporary arrangements have since been made which will ensure to Germany a considerable proportion of her pre-war consumption of minette ores. But some agreement which enabled the two separate but complementary natural regions of the Saar and the Ruhr to exchange their surplus products on a business basis would have tended to an earlier restoration of good feeling between the two countries.

One other question which arises in this connection is the extent to which the steel industry of Germany will suffer by the loss of the regions from which she obtained the semi-manufactured products necessary for it. On this subject it is dangerous to prophesy, but when we take into consideration the length of time required for the construction of modern steelworks, the technical skill involved in their management, and the uncertainties with regard to future supplies of fuel, it seems unlikely that France will attempt any rapid development of her steel industry. In that case the Ruhr will still continue to be an important market for Lorraine and the Saar.

Our general conclusion, then, is that the territorial arrangements which have been made do not necessarily imperil the economic stability of Germany. The economic consequences of the war are really much more serious than the economic consequences of the peace. Germany has for ten years to make good the difference between the actual and the pre-war production of the French mines which she destroyed. Her own miners are working shorter hours, and as a result her own production is reduced, and as British miners are doing the same she is unable to import from this country. For some years these deductions will represent a loss to her of about 40,000,000 tons per annum, and will undoubtedly make her position a serious one. But to give her either the Saar or the Upper Silesian coalfields would be to enable her to pass on to others the debt which she herself has incurred. The reduction of her annual deliveries of coal to France, Belgium, and Italy was, indeed, the best way in which to show mercy to her.

The position of Poland is geographically weak, partly because its surface features are such that the land has no well-well-marked individuality, and partly because there are on the east and west no natural boundaries to prevent invasion or to restrain the Poles from wandering far beyond the extreme limits of their State. Polish geographers themselves appear to be conscious of this geographical infirmity, as Vidal de la Blache would have termed it, and in an interesting little work Nalkowski has endeavoured to show that the very transitionality of the land between east and west entitles it to be regarded as a geographical entity. But transitionality is rather the negation of geographical individuality than the basis on which it may be established. And indeed no one has pointed out its dangers more clearly than Nalkowski himself. "The Polish people," he says, "living in this transitional country always were, and still are, a prey to a succession of dangers and struggles. They should be ever alert and courageous, remembering that on such a transitional plain, devoid of strategic frontiers, racial boundaries are marked only by the energy and civilisation of the people. If they are strong they advance those frontiers by pushing forward; by weakening and giving way they promote their contraction. So the mainland may thrust out arms into the sea, or, being weak, may be breached and even overwhelmed by the ocean floods." If we bear in mind the constant temptation to a people which is strong to advance its political no less than its racial frontiers, and the constant danger to which a weakening people is exposed of finding its political frontier contract even more rapidly than its racial, we shall realise some of the evils to which a State basing its existence on transitionality is exposed.

It is, then, to racial feeling, rather than to geographical environment, that we must look for the basis of the new Polish State, but the intensity with which this feeling is likely to operate varies considerably in different parts of the region which it is proposed to include. In the plébiscite area of Upper Silesia there were, according to the census of 1900, which is believed to represent the facts more accurately than that of 1910, seven Poles to three of other nationalities. In Prussian Poland, apart from the western districts which have not been annexed to Poland and the town and district of Bromberg, the Poles number at least 75 per cent. of the total population, and in the ceded and plébiscite areas of East and

West Prussia 52 per cent. Russian Poland, which contains rather more than two-thirds of the entire population of what we may call ethnic Poland, has 9,500,000 Poles and over 3,000,000 Jews, Germans, Lithuanians, and others, while West Galicia is almost solidly Polish. Thus out of a total population of 21,000,000 within the regions mentioned the Poles number 15,500,000, or about 75 per cent.

Bearing these facts in mind, it is possible to consider the potentialities of the new State. The population is sufficiently large and the Polish element within it is sufficiently strong to justify its independence on ethnical grounds. Moreover, the alien elements which it contains are united neither by racial ties nor by contiguity of settlement. In Posen, for example, there is in the part annexed by Poland a definitely Polish population with a number of isolated German settlements, while in Russian Poland the Jews are to be found mainly in the towns. Considered as a whole, Poland is at least as pure racially as the United States.

When we consider the economic resources of Poland we see that they also make for a strong and united State. It is true that in the past the country has failed to develop as an economic unit, but this is a natural result of the partitions and of the different economic systems which have prevailed in different regions. Even now, however, we can trace the growth of two belts of industrial activity which will eventually unite these different regions together. One is situated on the coalfield running from Oppeln in Silesia by Cracow and Lemberg, and is engaged in mining, agriculture, and forestry; while the other extends from Posen by Lodz to Warsaw, and has much agricultural wealth and an important textile industry. Moreover, the conditions, geographical and economic, are favourable to the growth of international trade. If Poland obtains Upper Silesia she will have more coal than she requires, and the Upper Silesian fields will, as in the past, export their surplus product to the surrounding countries, while the manufacturing districts will continue to find their best markets in the Russian area to the east. The outlets of the State are good, for not only has it for all practical purposes control of the port of Danzig, but it is able to share in the navigation of the Oder and it has easy access to the south by way of the Moravian Gap.

It seems obvious, therefore, that Poland can best seek compensation for the weakness of her geographical position by developing the natural resources which lie within her ethnic frontiers. By such a policy the different parts of the country will be more closely bound to one another than it is possible to bind them on a basis of racial affinity and national sentiment alone. Moreover, Poland is essentially the land of the Vistula, and whatever is done to improve navigation on that river will similarly tend to have a unifying effect upon the country as a whole. The mention of the Vistula, however, raises one point where geographical and ethnical conditions stand in marked antagonism to one another. The Poles have naturally tried to move down-stream to the mouth of the river which gives their country what little geographical individuality it possesses, and the Polish corridor is the expression of the movement. On the other hand, the peoples of East and West Prussia are one and the same. The geographical reasons for giving Poland access to the sea are no doubt stronger than the historical reasons for leaving East Prussia united to the remainder of Germany, but strategically the position of the corridor is as bad as it can be, and the solution arrived at may not be accepted as final.

Lastly, we may consider the case of East Galicia, which the Poles claim not on geographical grounds, because it is in reality part of the Ukraine, and not on ethnical grounds, because the great majority of the inhabitants are Little Russians, but on the ground that they are and have for long been the ruling race in the land. It may also be that they are not uninfluenced by the fact that the region contains considerable stores of mineral oil. But as the claim of the Poles to form an independent State is based on the fact that they form a separate race it is obviously unwise to weaken that claim by annexing a land which counts over 3,000,000 Ruthenes to one-third that number of Poles. Further, the same argument which the Poles use in regard to East Galicia could with no less reason be used by the Germans in Upper Silesia. Mr. Keynes, indeed, suggests that the Allies should declare that in their judgment economic conditions require the inclusion of the coal districts of Upper Silesia in Germany unless the wishes of the inhabitants are decidedly to the contrary. It is not improbable that East Galicia would give a more emphatic vote against Polish rule than Upper Silesia will give for it. If Poland is to ensure her position she must forget the limits of her former empire, turn her back on the Russian plain, with all the temptations which it offers, and resolutely set herself to the development of the basin of the Vistula, where alone she can find the conditions which make for strength and safety.

Czecho-Slovakia is in various ways the most interesting country in the reconstructed Europe. Both geographically and ethnically it is marked by some features of great strength, and by others which are a source of considerable weakness to it. Bohemia by its physical structure and its strategic position seems designed by Nature to be the home of a strong and homogeneous people. Moravia attaches itself more or less naturally to it, since it belongs in part to the Bohemian massif and is in part a dependency of that massif. Slovakia is Carpathian country, with a strip of the Hungarian plain. Thus, while Bohemia possesses great geographical individuality and Slovakia is at least strategically strong, Czecho-Slovakia as a whole does not possess geographical unity and is in a sense strategically weak, since Moravia, which unites the two upland wings of the State, lies across the great route which leads from the Adriatic to the plains of Northern Europe. The country might easily, therefore, be cut in two as the result of a successful attack, either from the north or from the south. Later I shall endeavour to indicate certain compensations arising out of this diversity of geographical features, but for the moment at least they do not affect our argument.

We have, further, to note that the geographical and ethnical conditions are not altogether concordant. In Bohemia there is in the basin of the Eger in the north-west an almost homogeneous belt of German people, and on the north-eastern and south-western borderlands there are also strips of country in which the Germanic element is in a considerable majority. It is no doubt true, as Mr. Wallis has shown, that the Czechs are increasing in number more rapidly than the Germans, but on ethnical grounds alone there are undoubtedly strong reasons for detaching at least the north-western district from the Czecho-Slovak State. We feel justified in arguing, however, that here at least the governing factors are and must be geographical. To partition a country which seems predestined by its geographical features to be united and independent would give rise to an intolerable sense of injustice. I do not regard the matter either from the strategic or from the economic point of view, though both of these are no doubt important. What I have in mind is the influence which the geographical conditions of a country exercise upon the political ideas of its inhabitants. It is easy to denounce, as Mr. Toynbee does, "the pernicious doctrine of natural frontiers," but they will cease to appeal to the human mind only when mountain and river, highland and plain cease to appeal to the human imagination. With good sense on both sides the difficulties in this particular case are not insurmountable. The Germans of Eger valley, which is known as German Bohemia, have never looked to Germany for leadership nor regarded it as their home, and their main desire has hitherto been to form a separate province in the Austrian Empire. A liberal measure of autonomy might convert them into patriotic citizens, and if they would but condescend to learn the Czech language they might come to play an important part in the government of the country.

In Slovakia also there are racial differences. Within the mountain area the Slovaks form the great majority of the population, but in the valleys, and on the plains of the Danube to which the valleys open out, the Magyar element predominates. Moreover, it is the Magyar element which is racially the stronger, and before which the Slovaks are gradually retiring. Geographical and ethnical conditions therefore unite in fixing the political frontier between Magyar and Slovak at the meeting place of hill and plain. But on the west such a frontier would have been politically inexpedient because of its length and irregularity, and economically disadvantageous because the river valleys, of which there are about a dozen, would have had no easy means of communication with one another or with the outside world. Hence the frontier was carried south to the Danube, and about 1,000,000 Magyars were included in the total population of 3,500,000. Nor is the prospect of assimilating these Magyars particularly bright. The Germans in Bohemia are cut off from the Fatherland by mountain ranges, and, as we have seen, it does not appear to present any great attraction to them. It is otherwise in Slovakia, where the Magyars of the lowland live in close touch with those of the Alfold, and it may be long ere they forget their connection with them. The danger of transferring territory not on geographical or ethnical, but on economic, grounds could not be more strikingly illustrated.

With regard to economic development, the future of the new State would appear to be well assured. Bohemia and Moravia were the most important industrial areas in the old Austrian Empire, and Slovakia, in addition to much good agricultural land, contains considerable stores of coal and iron. But if Czecho-Slovakia is to be knit together into a political and economic unit, its communications will have to be developed. We have already suggested that the geographical diversity of the country offers certain compensation for its lack of unity, but these cannot be taken advantage of until its different regions are more closely knit together than they are at present. The north of Bohemia finds its natural outlet both by rail and water through German ports. The south-east of Bohemia and Moravia look towards Vienna. In Slovakia the railways, with only one important exception, converge upon Budapest. The people appear to be alive to the necessity of remedying this state of affairs, and no fewer than fifteen new railways have been projected, which, when completed, will unite Bohemia and Moravia more closely to one another and Slovakia. Moreover, it is proposed to develop the waterways of the country by constructing a canal from the Danube at Pressburg to the Oder. From this canal another will branch off at Prerau and run to Pardubitz on the Elbe, below which point that river has still to be canalised. If these improvements are carried out the position of Czecho-Slovakia will, for an inland State, be remarkably strong. It will have through communication by water with the Black Sea, the North Sea, and the Baltic, and some of the most important land routes of the Continent already run through it. On the other hand, its access to the Adriatic is handicapped by the fact that in order to reach that sea its goods will have to pass through the territory of two, if not of three, other States, and however well the doctrine of economic rights of way may sound in theory, there are undoubted drawbacks to it in practice. Even with the best intentions, neighbouring States may fail to afford adequate means of transport through defective organisation, trade disputes, or various other reasons. It is probable, therefore, that the development of internal communications will in the end be to the advantage of the German ports, and more especially of Hamburg. But the other outlets of the State will certainly tend towards the preservation of its economic independence.

The extent to which Rumania has improved her position as a result of the war is for the present a matter of speculation. On the one hand she has added greatly to the territory which she previously held, and superficially she has rendered it more compact; but on the other she has lost her unity of outlook, and strategically at least weakened her position by the abandonment of the Carpathians as her frontier. Again, whereas before the war she had a fairly homogeneous population—probably from 90 to 95 per cent. of the 7,250,000 people in the country being of Rumanian stock—she has, by the annexation of Transylvania, added an area of 22,000 square miles of territory, in which the Rumanians number less than one and a half out of a total of two and two-third millions. In that part of the Banat which she has obtained there is also a considerable alien element. It is in this combination of geographical division and ethnic intermixture that we may foresee a danger to Rumanian unity. That part of the State which is ethnically least Rumanian is separated from the remainder of the country by a high mountain range, and in its geographical outlook no less than in the racial sympathies of a great number of its inhabitants is turned towards the west, while pre-war Rumania remains pointed towards the south-east. Economically also there is a diversity of interest, and the historical tie is perhaps the most potent factor in binding the two regions together. It is not impossible, therefore, that two autonomous States may eventually be established, more or less closely united according to circumstances.

The position in the Dobruja is also open to criticism. Geographically the region belongs to Bulgaria, and the Danube will always be regarded as their true frontier by the Bulgarian people. Ethnically its composition is very mixed, and whatever it was originaly, it certainly was not a Rumanian land. But after the Rumanians had rather unwillingly been compelled to accept it in exchange for Bessarabia, filched from them by the Russians, their numbers increased and their economic develpoment of the region, and more especially of the port of Constanza, undoubtedly gave them some claims to the northern part of it. As so often happens, however, when a country receives part of a natural region beyond its boundaries, Rumania is fertile in excuses for annexing more of the Dobruja. To the southern part, which she received after the Balkan wars, and in the possession of which she has been confirmed by the peace terms with Bulgaria, she has neither ethnically nor economically any manner of right. The southern Dobruja is a fertile area which, before its annexation, formed the natural hinterland of the ports of Varna and Ruschuk. Her occupation of it will inevitably draw Rumania on to further intervention in Bulgarian affairs.

The arrangements which have been made with regard to the Banat must be considered in relation to the Magyar position in the Hungarian plain. The eastern country of the Banat, Krasso-Szörény, has a population which is in the main Rumanian, and as it belongs to the Carpathian area it is rightly included with Transylvania in Rumanian territory. In the remainder of the Banat, including Arad, the Rumanians form less than one-third of the total population, which also comprises Magyars, Germans, and Serbs. The Hungarian plain is a great natural region, capable of sub-division no doubt, but still a great natural region, in which the Magyar element is predominant. The natural limit of that plain is the mountain region which surrounds it, and to that limit at least the Magyar political power will constantly press. But Rumania has been permitted to descend from the mountains and Jugo-Slavia to cross the great river which forms her natural boundary, and both have obtained a foothold on the plain where it may be only too easy for them to seek occasion for further advances. And it cannot be urged that the principle of self-determination would have been violated by leaving the Western Banat to the Magyars. No plébiscite was taken, and it is impossible to say how the German element would have given what in the circumstances would have been the determining vote. Finally, as it was necessary to place nearly a million Magyars in Transylvania under Rumanian rule, it might not have been altogether expedient to leave some Rumanians on Hungarian soil.

For the extension of Jugo-Slavia beyond the Danube two pleas have been advanced, one ethnical and the other strategic. Neither is really valid. It is true that there is a Serbian area to the north of Belgrade, but the total number of Serbs within the part assigned to Jugo-Slavia probably does not much exceed 300,000. The strategic argument that the land which they ocupy is necessary for the defence of the capital is equally inconclusive. From the military point of view it does not easily lend itself to defensive operations, and when we consider the political needs of the country we cannot avoid the conclusion that a much better solution might have been found in the removal of the capital to some more central position. The Danube is certainly a better defensive frontier than the somewhat arbitrary line which the Supreme Council has drawn across the Hungarian plain.

In fact, it is in the treatment of the Hungarian plain that we feel most disposed to criticise the territorial settlements of the Peace Treaties. Geographical principles have been violated by the dismemberment of a region in which the Magyars were in a majority, and in which they were steadily improving their position. Ethnical principles have been violated, both in the north, where a distinctly Magyar region has been added to Slovakia, and in the south where the eastern Banat and Backa have been divided between the Rumanians and the Jugo-Slavs, who together form a minority of the total population. For the transfer of Arad to Rumania and of the Burgenland to Austria more is to be said, but the position as a whole is one of unstable equilibrium, and can only be maintained by support from without. In this part of Europe at least a League of Nations will not have to seek for its troubles.

When we turn to Austria we are confronted with the great tragedy in the reconstruction of Europe. Of that country it could once be said " Bella gerant alii, tu felix Austria nube," but to-day, when dynastic bonds have been loosened, the constituent parts of the great but heterogeneous empire which she thus built up have each gone its own way. And for that result Austria itself is to blame. She failed to realise that an empire such as hers could only be permanently retained on a basis of common political and economic interest. Instead of adopting such a policy, however, she exploited rather than developed the subject nationalities, and to-day their economic, no less than their political, independence of her is vital to their existence. Thus it is that the Austrian capital, which occupies a situation unrivalled in Europe, and which before the war numbered over 2,000,000 souls, finds herself with her occupation gone. For the moment Vienna is not necessary either to Austria or to the so-called Succession States, and she will not be necessary to them until she again has definite functions to perform. I do not overlook the fact that Vienna is also an industrial city, and that it, as well as various other towns in Lower Austria, are at present unable to obtain either raw materials for their industries or foodstuffs for their inhabitants. But there are already indications that this state of affairs will shortly be ameliorated by economic treaties with the neighbouring States. And what I am particularly concerned with is not the temporary but the permanent effects of the change which has taken place. The entire political re-orientation of Austria is necessary if she is to emerge successfully from her present trials, and such a re-orientation must be brought about with due regard to geographical and ethnical conditions. The two courses which are open to her lead in opposite directions. On the one hand she may become a member of a Danubian confederation, on the other she may throw in her lot with the German people. The first would really imply an attempt to restore the economic position which she held before the war, but it is questionable whether it is either possible or expedient for her to make such an attempt. A Danubian confederation will inevitably be of slow growth, as it is only under the pressure of economic necessity that it will be joined by the various nationalities of south-eastern Europe. The sugestions made by Mr. Asquith, Mr. Keynes, and others, for a compulsory free-trade union would, if carried into effect, be provocative of the most intense resentment among most, if not all, of the States concerned. But even if a Danubian confederation were established it does not follow that Austria would be able to play a part in it similar to that which she played in the Dual Monarchy. With the construction of new railways and the growth of new commercial centres it is probable that much of the trade with the south-east of Europe which formerly passed through Vienna will in future go to the east of that city. Even now Pressburg, or Bratislava, to give it the name by which it will hence be known, is rapidly developing at the expense alike of Vienna and Budapest. Finally, Austria has in the past shown little capacity to understand the Slav peoples, and in any case her position in what would primarily be a Slav confederation would be an invidious one. For these reasons we turn to the suggestion that Austria should enter the German Empire, which, both on geographical and ethnical grounds, would appear to be her proper place. Geographically she is German, because the bulk of the territory left to her belongs either to the Alpine range or to the Alpine foreland. It is only when we reach the basin of Vienna that we leave the mid-world mountain system and look towards the south-east of Europe across the great Hungarian plain. Ethnically, of course, she is essentially German. Now although my argument hitherto has rather endeavoured to show that the transfer of territory from one State to another on purely economic grounds is seldom to be justified, it is equally indefensible to argue that two States which are geographically and ethnically related are not to be allowed to unite their fortunes because it would be to their interest to do so. And that it would be to their interest there seems little doubt. Austria would still be able to derive some of her raw materials and foodstuffs from the Succession States, and she would have, in addition, a great German area in which she would find scope for her commercial and financial activities. Even if Naumann were but playing the part of the Tempter, who said, "All these things will I give thee if thou wilt fall down and worship me," he undoubtedly told the truth when he said, "The whole of Germany is now more open to the Viennese crafts than ever before. The Viennese might make an artistic conquest extending to Hamburg and Danzig." But not only would Austria find a market for her industrial products in Germany, she would become the great trading centre between Germany and south-east Europe, and in that way would once more be, but in a newer and better sense than before, the *Ostmark* of the German people.

The absorption of Austria in Germany is opposed by France, mainly because she cannot conceive that her great secular struggle with the people on the other side of the Rhine will ever come to an end, and she fears the addition of 6,500,000 to the population of her ancient enemy. But quite apart from the fact that Germany and Austria cannot permanently be prevented from following a common destiny if they so desire, and apart from the fact that politically it is desirable they should do so with at least the tacit assent of the Allied Powers rather than in face of their avowed hostility, there are reasons for thinking that any danger to which France might be exposed by the additional man-power given to Germany would be more than compensated for by the altered political condition in Germany herself. Vienna would form an effective counterpoise to Berlin, and all the more so because she is a great geographical centre, while Berlin is more or less a political creation. The South German people have never loved the latter city, and to-day they love her less than ever. In Vienna they would find not only a kindred civilisation with which they would be in sympathy, but a political leadership to which they would readily give heed. In such a Germany, divided in its allegiance between Berlin and Vienna, Prussian animosity to France would be more or less neutralised. Nor would Germany suffer disproportionately to her gain, since in the intermingling of Northern efficiency with Southern culture she would find a remedy for much of the present discontents. When the time comes, and Austria seeks to ally herself with her kin, we hope that no impassable obstacle will be placed in her way.

The long and as yet unsettled controversy on the limits of the Italian Kingdom illustrates very well the difficulties which may arise when geographical and ethnical conditions are subordinated to considerations of military strategy, history, and sentiment in the determination of national boundaries. The annexation of the Alto Adige has been generally accepted as inevitable. It is true that the population is German, but here, as in Bohemia, geographical conditions appear to speak the final word. Strategically also the frontier is good, and will do much to allay Italian anxiety with regard to the future. Hence, although ethnical conditions are to some extent ignored, the settlement which has been made will probably be a lasting one.

On the east the natural frontier of Italy obviously runs across the uplands from some point near the eastern extremity of the Carnic Alps to the Adriatic. The pre-war frontier was unsatisfactory for one reason because it assigned to Austria the essentially Italian region of the lower Isonzo. But once the lowlands are left on the west the uplands which border them on the east, whether Alpin or Karst, mark the natural limits of the Italian Kingdom, and beyond a position on them for strategic reasons the Italians have no claims in this direction except what they can establish on ethnical grounds. To these, therefore, we turn. In Carniola the Slovenes are in a large majority, and in Gorizia they also form the bulk of the population. On the other hand, in the town and district of Trieste the Italians predominate, and they also form a solid block on the west coast of Istria, though the rest of that country is peopled mainly by Slovenes. It seems to follow, therefore, that the plains of the Isonzo, the district of Trieste, and the west coast of Istria, with as much of the neighbouring upland as is necessary to secure their safety and communications, should be Italian, and that the remainder should pass to the Jugo-Slavs. The so-called Wilson line, which runs from the neighbourhood of Tarvis to the mouth of the Arsa, met these requirements fairly well, though it placed from 300,000 to 400,000 Jugo-Slavs under Italian rule to less than 50,000 Italians, half of whom are in Fiume itself transferred to the Jugo-Slavs. Any additional territory must, by incorporating a larger alien element, be a source of weakness and not of strength to Italy. To Fiume the Italians have no claim beyond the fact that in the town itself they slightly outnumber the Croats, though in the double town of Fiume-Sushak there is a large Slav majority. Beyond the sentimental reasons which they urge in public, however, there is the economic argument, which, perhaps wisely, they keep in the background. So long as Trieste and Fiume belonged to the same empire the limits within which each operated were fairly well defined, but if Fiume become Jugo-Slav it will not only prove a serious rival to Trieste, but will prevent Italy from exercising absolute control over much of the trade of Central Europe. For Trieste itself Italy has in truth little need, and the present condition of that city is eloquent testimony of the extent to which it depended for its prosperity upon the Austrian and German Empires. In the interests, then, not only of Jugo-Slavia but of Europe generally, Fiume must not become Italian, and the idea of constituting it a Free State might well be abandoned. Its development is more fully assured as the one great port of Jugo-Slavia than under any other form of government.

With regard to Italian claims in the Adriatic, little need be said. To the Dalmatian coast Italy has no right either on geographical or on ethnical grounds, and the possession of Pola, Valona, and some of the islands gives her all the strategic advantages which she has reason to demand. But, after all, the only danger which could threaten her in the Adriatic would come from Jugo-Slavia, and her best insurance against that danger would be an agreement by which the Adriatic should be neutralised. The destruction of the Austro-Hungarian fleet offers Italy a great opportunity of which she would do well to take advantage.

Of the prospects of Jugo-Slavia it is hard to speak with any feeling of certainty. With the exception of parts of Croatia-Slavonia and of Southern Hungary, the country is from the physical point of view essentially Balkan, and diversity rather than unity is its most pronounced characteristic. From this physical diversity there naturally results a diversity in outlook which might indeed be all to the good if the different parts of the country were linked together by a well-developed system of communication. Owing to the structure of the land, however, such a system will take long to complete.

Ethnic affinity forms the real basis of union, but whether that union implies unity is another matter. It is arguable that repulsion from the various peoples—Magyars, Turks, and Austrians—by whom they have been oppressed, rather than the attraction of kinship, is the force which has brought the Jugo-Slavs together. In any case the obstacles in the way of the growth of a strong national feeling are many. Serb, Croat, and Slovene, though they are all members of the Slav family, have each their distinctions and characteristics which political differences may tend to exaggerate rather than obliterate. In Serbian Macedonia, again, out of a total population of 1,100,000, there are 400,000 to 500,000 people who, though Slavs, are Bulgarian in their sympathies, and between Serb and Bulgarian there will long be bitter enmity. Religious differences are not wanting. The Serbs belong to the Orthodox Church, but the Croats are Catholics, and in Bosnia there is a strong Mohammedan element. Cultural conditions show a wide range. The Macedonian Serb, who has but lately escaped from Turkish misrule, the untutored but independent Montenegrin, the Dalmatian, with his long tradition of Italian civilisation, the Serb of the kingdom, a sturdy fighter but without great political insight, and the Croat and Slovene, whose intellectual superiority is generally admitted, all stand on different levels in the scale of civilisation. To build up out of elements in many respects so diverse a common nationality without destroying what is best in each will be a long and laborious task. Economic conditions are not likely to be of much assistance. It is true that they are fairly uniform through Jugo-Slavia, and it is improbable that the economic interests of different regions will conflict to any great extent. On the other hand, since each region is more or less self-supporting, they will naturally unite into an economic whole less easily than if there had been greater diversity. What the future holds for Jugo-Slavia it is as yet impossible to say; but the country is one of great potentialities, and a long period of political rest might render possible the development of an important State.

This brings me to my conclusion. I have endeavoured to consider the great changes which have been made in Europe not in regard to the extent to which they do or do not comply with the canons of boundary-making, for after all there are no frontiers in Europe which can in these days of modern warfare be considered as providing a sure defence, but in regard rather to the stability of the States concerned. A great experiment has been made in the new settlement of Europe, and an experiment which contains at least the germs of success. But in many ways it falls far short of perfection, and even if it were perfect it could not be permanent. The methods which ought to be adopted to render it more equable and to adapt it to changing needs it is not for us to discuss here. But as geographers engaged in the study of the ever-changing relations of man to his environment we can play an important part in the formation of that enlightened public opinion upon which alone a society of nations can be established.

## Review.

"The West Riding of Yorkshire." By Bernard Hobson, M.Sc., F.G.S., late Lecturer in Geology in the Victoria University of Manchester. Cambridge University Press, 1921. 3/6 net.

This is one of the latest of the series of county geographies, and most adequately maintains the high reputation for accuracy and thoroughness won by its predecessors. It is impossible to imagine a manual of such modest dimensions more compact with information. From the point of view of scientific interest, of its great industrial developments, its agricultural importance, the beauties of its scenery, its antiquities, its notable men and women and the part it has played in the national history, the West Riding may justly be regarded as one of the most important of the county divisions of England, and the present little volume contains the most compact information possible under all these heads. The pictures are particularly well chosen, and the list of chief towns and villages at the end is one of the fullest and most useful that we have noticed in any one of this series. M. G. H.

# MEETING OF THE BRITISH ASSOCIATION FOR ADVANCEMENT OF SCIENCE, CARDIFF.

August 24th to 28th, 1920.

(Report of the Delegate, T. W. Sowerbutts, submitted to a meeting of the Society held on October 5th, 1920.)

Although the attendance at this meeting was not a large one, it was probably much more of a business meeting than is usually the case, when the Association visits a recognised holiday resort.

Cardiff is a city which lends itself admirably to a gathering of this character, as the main Public Buildings are grouped on an excellent site lying to the north of the business portion of the city. This area has been laid out with an idea to spaciousness, and advantage has been taken of the old trees already waiting to add their beauty to the fine buildings.

Passing from the main thoroughfares of the city we leave the castle on our left and come upon an open space giving a fine view of the National Museum, the City Hall and the Law Courts. Between the two latter commences a fine avenue of old trees (King Edward VII Avenue) with the County Offices and Technical College on one side, and an attractive garden on the other, opposite the end of which is the Aberdare Hall. Commencing between the City Hall and the National Museum, a parallel avenue has been planted (Museum Avenue), on one side of which is the University College. The remainder of this extensive site is being reserved for public buildings of a similar character, but retaining sufficient space for vegetation and to afford proper view points for the really fine buildings around.

The Handbook issued by the Association is attractively got up, and contains a good map of the district round Cardiff, with some valuable papers, " Prehistoric Remains," by John Ward, M.A., F.S.A.; " The Lordship of Glamorgan," by J. E. Corbett; " Local Place Names," by H. J. Randall, LL.B.; " Cardiff and its Municipal Government," by J. L. W. Matley (ex-Town Clerk); "Education in Cardiff," by Herbert M. Thompson; "The Cardiff Public Library," by Harry Farr, F.L.A. (City Librarian); "Museums in Cardiff," by John Ward, M.A., F.S.A., and A. H. Lee, M.C.; "Railways," by Thos. A. Walker; "Docks," by W. J. Holloway; "Shipping," by R. O. Sanderson; "Mining Features of the South Wales Coalfield," by Hugh Bramwell; "Coal Trade of South Wales," "Iron and Steel," "Ship Repairing," "Patent Fuel," "Portland Cement," "Silica and Firebrick," "Agriculture," "Scientific Societies," "Meteorology," "Botany," "Zoology," and last but not least "Geology of the Cardiff District," by Prof. A. H. Cox, D.Sc., Ph.D., F.S.L.

The Inaugural Meeting was held in the Park Hall on Tuesday evening, when Prof. W. A. Herdman, C.B., F.R.S., delivered his Presidential Address on "Oceanography and the Sea Fisheries," which as usual was attended by a large gathering of members and friends.

On Wednesday evening the Mayoral Reception was held in the City Hall, while on Thursday evening, in the Park Hall, Sir R. T. Glazebrook, K.C.B., F.R.S., discoursed on "Some Requirements of Modern Aircraft," and in the same place on Friday evening Sir Daniel Hall, K.C.B., F.R.S., gave an interesting address on "A Grain of Wheat from the Field to the Table."

The proceedings of Section E (Geography) commenced, of course, with the President's Address in which our old friend, Mr. J. McFarlane, M.A., dealt in a most interesting manner with the changes in the map of Europe brought about by the war, which is, by his permission, reprinted in this issue of our Journal. (See page 34).

Mr. D. Lleufer Thomas read an interesting paper on "Some Geographical Aspects of the Distribution of Population on the South Wales Coalfield," arguing that the narrow valleys of the plateau provoke feelings of imprisonment and isolation; originally the coal attracted the raw material of industry, copper, iron, etc., that after 1850 coal was worked in the interior valleys. The Rhondda Valley became populous after 1871 and caused the growth of Cardiff and Barry.

Dr. A. E. Trueman, in dealing with "The Iron Industry of South Wales," pointed out that iron ore has been worked intermittently from Roman times.

Lieut.-Col. W. J. Johnston, C.B.E., R.E., in discussing "Small-scale maps of the United Kingdom," stated that the demand for coloured maps is increasing, and that of three methods in use at the Ordnance Survey, that dependent on photo-zincography is probably best. Engraving on copper is practically dead. This was followed by a paper by Mr. A. E. L. Hudson on "Some Methods of Using Ordnance Maps in School Teaching," and said that by constructing maps using one thickness of paper for each contour he gave the children some idea of the *actual* elevation.

Dr. Vaughan Cornish gave one of his illuminating addresses on "Imperial Capitals."

The Rev. W. J. Barton described and illustrated "The Oases and Shotts of Southern Tunis," and Prof. E. H. L. Schwarz gave "The Kalahari and the Possibilities of its Irrigation," dealing with his efforts to get this considered and acted upon in South Africa.

Dr. T. Ashby dealt with "The Water Supply of Ancient Rome," showing the four chief aqueducts of Ancient Rome, the Anio Valley, its river and springs, recent exploration along the course of the aqueducts, and winding up with some geographical considerations.

The proceedings of the Section were brought to a close by a joint meeting with Section A to consider "The urgent need for the creation within the Empire of a Central Institution for Training and Research in the Science of Surveying, Hydrography and Geodesy."

In Section I (Education), Prof. J. L. Myres gave a much appreciated address on "The Place of Geography in a Reformed Classical Course," contending that recent decisions about "compulsory Greek" compel drastic revision of classical teaching. With language courses restricted and postponed, the aim must be earlier acquaintance with ancient conduct and thought, through closer co-ordination between history, literature, and geography. The Mediterranean region being exceptionally suited to supplement, by contrast, Homeland notions of Geography, and being also the physical cradle of those ancient cultures, Hebrew and Græco-Roman, which have most influenced our own: reformed "classical" education would begin by illustrating, through ancient narrative and description, in translations, man's behaviour under these conditions, both normally and in great crises; and his solutions of social and moral problems in ancient times compared with ours. Later, these episodes would be linked, chronologically and topographically, to illustrate historical growth and interaction between local types. But study of "special periods" would be reserved till these outlines were familiar, and ancient languages until required for appreciation of literature.

The Committee of Section E passed the following resolution :—

> "That the Committee of Section E (Geography) of the British Association for the Advancement of Science begs leave to ask the President of the Board of Education to give schools permission to include Geography as a subject on a level with the other subjects in advanced courses of suitable type in Mathematics and Science, in Classics, and in Modern Studies."

The Conference of Delegates met on Wednesday and Friday afternoons.

Mr. T. Sheppard, F.G.S., introduced as a subject for discussion "The Evolution of Topographical and Geological Maps," after which the delegates were entertained to tea by Principal A. H. Trow, D.Sc., F.L.S., President of the Cardiff Naturalists' Society.

Your delegate reported that the Resolution passed by the Conference at Bournemouth in 1919 (on the Teaching of Geography) had been forwarded to the Council of the Association and remitted by them to the Committee of Section E, which Committee had passed the resolution reported above. The report was approved.

The proceedings for 1920 were brought to a close by a useful and interesting discussion on "The Status of Local Societies—the means of developing their objects, of getting new members, of making announcements and publishing papers," which was introduced by our veteran colleague, Mr. William Whitaker.

# Proceedings of the Society.*

## 1920.

The 1,116th Meeting of the Society was held on Tuesday, January 6th, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

The election was announced of the following Ordinary Members: Mrs. Dolman, Messrs. C. Gemmill Girvan, G. A. Hartington, J. G. Hutchinson, Alfred Johnson, William Proctor and Fred Taylor.

Hon. Prof. Sir W. Boyd Dawkins, D.Sc., F.R.S., lectured on "The Geography of Britain at the time of the arrival of Man." See p. 1.

Colonel Crook, in according a hearty vote of thanks to Sir W. Boyd Dawkins, said the lecture had shown them that really to understand geography, and become good geographers they must make researches and get a knowledge of many other sciences and subjects. They were, therefore, greatly indebted to Sir W. Boyd Dawkins for throwing this light upon the early geography of these islands as only an expert of his great ability could do. They regretted that, through the causes he had explained, they had not seen him at the Society's meetings as often as they would have wished. In the days of which he had spoken there was no need for submarine tunnels between England and Ireland or between England and France, and they would like an opportunity of listening to him upon some of the more recent information on these projects. Personally he (Colonel Crook) thought the Irish scheme impracticable on account of that deep channel which existed between the south-west coast of Scotland and the north-east coast of Ireland.

Sir W. Boyd Dawkins, in replying, said that though he had nothing to do with the existing scheme for tunnelling the English Channel he had no doubt, from the geological observations which he previously took on the French and the English sides and the workings which were carried on to a distance of about 2,300 yards from each direction, that it would be an extremely easy enterprise. The lower chalk was practically water-tight, and in his opinion there was no chance whatever of the sea breaking into it. If it was said, he added, that Providence had placed the sea there to prevent Britain becoming joined with France, Providence had also arranged matters that engineers were given an easy task in making a way across. Regarding the Irish idea Sir Edward Watkin had consulted him about the present scheme, and it was apparently the revival of an old scheme. With regard to that he had advised certain friends of his not to consider it on account of the deep narrow ravine which existed in the northern portion of the Irish Sea. That, he took it, would be a difficulty which could hardly be overcome by engineering skill. " This is my theory," he continued, " because you don't know what the bottom of that narrow gut is composed of; you don't know whether it is sand or gravel, and you cannot tell what will happen when the tunnel hits it—you may come to water bearing material or you may have the whole of the sea upon you. I, therefore, would not be inclined to undertake any responsibility in regard to it."

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* All the meetings were held in the Geographical Hall unless otherwise stated.

The vote of thanks was passed with cordial unanimity.

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The 1,117th Meeting of the Society was held on Tuesday, January 13th, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

The Chairman mentioned the loss by death of Mr. Walter Speakman, Secretary of the Chamber of Commerce, and a resolution was adopted expressing sympathy with Mrs. Speakman and the members of the family.

The election was announced of the following as Ordinary Members: Messrs. C. W. Battersby, Walter Gatwood, Thomas Ashby Needham, B.A., and W. Proudfoot.

Mr. Alan G. Ogilvie, O.B.E., M.A., D.Sc., F.R.G.S., Lecturer in Geography at the Manchester University, delivered a lecture on " Glaciers and Ice Sheets."

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The 1,118th Meeting of the Society was held on Friday, January 16th, 1920, at 3.30 p.m. Mr. E. W. Mellor, F.R.G.S., F.R.P.S,, presided,

Dr. James Brierley, M.A. (Oxon), M.D., F.R.G.S., lectured on "The Danish Colonies in Greenland."

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The 1,119th Meeting of the Society was held on Tuesday, January 20th, 1920, at 7.30 p.m. Mr. Egbert Steinthal presided.

Mr. Wilfred Mark Webb, F.L.S., F.R.M.S. (General Secretary of the Selborne Society), delivered an address on " The Selborne Country and Gilbert White."

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The 1,120th Meeting of the Society was held on Tuesday, January 27th, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

The election of the following as Ordinary Members was announced: Deaconess Amelia Bromley, Messrs. Joseph Berry, and James Hardy Mellor.

Dr. A. C. Magian, F.R.G.S., spoke to the members on " The Battlefields of France and Belgium."

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The 1,121st Meeting of the Society was held on Tuesday, February 3rd, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

Miss L. Edna Walter, M.B.E., H.M.I., delivered a lecture on " The Fascination of Ireland."

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The 1,122nd Meeting of the Society was held on Tuesday, February 10th, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

Dr. Albert Wilmore, F.G.S., lectured on "The British Coasts: their Variety and Charm."

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The 1,123rd Meeting of the Society was held on Friday, February 13th, 1920, at 3.30 p.m. Mr. E. W. Mellor, F.R.G.S., F.R.P.S., presided.

Mr. C. B. Fawcett, B.Litt., M.Sc., F.R.G.S. (Reader in Geography in the Leeds University), delivered a lecture on "Some Geographical Factors in the Evolution of Navigation." (See p. 7).

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The 1,124th Meeting of the Society was held on Tuesday, February 17th, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

Mr. John Hilditch, F.R.G.S., lectured on "Fallacies and Fact concerning Chinese Jade."

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The 1,125th Meeting of the Society was held on Tuesday, February 24th, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

The Chairman announced that Mr. Percival J. Ashton, in consequence of sudden illness, had to postpone his address, and Mr. Hockin had at very short notice consented to fill the vacancy.

It was announced that the Rt. Hon. Sir William Mather had presented to the Society the two handsome volumes of "Russia, Mongolia, China, etc.," by John F. Baddeley.

Mr. C. Owen Hockin then gave an address on "The Firth of Clyde, and the Royal Route to the Highlands."

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The 1,126th Meeting of the Society was held on Tuesday, March 2nd, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

The Chairman referred to the great loss the Society had sustained through the death of Mr. Hermann Woolley, F.R.G.S., who was one of the original members of the Society. A resolution was passed expressing the regret and sympathy felt by the members present.

The election was announced of the following Ordinary Members: Miss H. C. Hill, Messrs. J. Stanley Ashmore, Thomas Arthur Cocker, Robert Percy Cooper, Herbert Hilton, and W. H. Ormerod.

Mr. Charles Sutton, F.A.I., delivered a lecture on "A Post-War Visit to Belgium."

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The 1,127th Meeting of the Society was held on Tuesday, March 9th, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

The death of Mr. Marcus Morreau was noted with regret.

The Rev. B. Dennis Jones, M.A., O.B.E., Precentor and Minor Canon Manchester Cathedral, lectured on "Down the Nile to Jerusalem," being a description of part of his experiences during the war in East Africa, Egypt, and Palestine.

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The 1,128th Meeting of the Society was held on Tuesday, March 16th, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

Mrs. Frost (née Bertha Glazier) delivered an address on "Life in China, as I saw it," which was illustrated by an exhibition of over

200 of her water-colour drawings executed during her long residence in China. (See p. 24.)

The 1,129th Meeting of the Society was held on Friday, March 19th, 1920, at 3.30 p.m. Mr. E. W. Mellor, F.R.G.S., F.R.P.S., presided, and Mrs. Frost repeated her lecture on China.

During the week the exhibition remained open, and seven other addresses, based on Mrs. Frost's lecture, and explanatory of the drawings, were given by three of our Victorians, to audiences consisting of students from local schools and colleges, Members and Friends. The total attendance for the week was over 2,000. The Trellis work, from which the drawings were suspended, was kindly lent by Messrs. Baxendale & Co. Ltd.

The 1,130th Meeting of the Society was held on Tuesday, March 23rd, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

Captain G. R. Swaine, F.R.Met.S., lectured on "The Influences of Geographical Environment."

The 1,131st Meeting of the Society was held on Tuesday, March 30th, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

The election was announced of Miss Alice G. Whale as an Ordinary Member.

The Chairman apologised for the absence of Mr. Arnold Williams, and remarked that the thanks of the members were due to Mr. Jacoby for coming forward at very short notice to take his place.

Mr. S. Pearson Jacoby, M.C., Croix de Guerre, then gave a lecture on "Some Patrol Work in German East Africa."

## ANNUAL MEETING, 1920.

The Thirty-fifth Annual Meeting of the Society was held by kind permission in the Lord Mayor's Parlour, Town Hall, on Friday, May 7th, at 3.0 p.m. Mr. E. W. Mellor, J.P., F.R.G.S., F.R.P.S., presided, and there were present:—Messrs. J. E. Balmer, Elisha Bardsley, J.P., E. Barlow, Miss Blanchoud, Deaconess A. Bromley, Messrs. W. S. Buckley, W. Burton, R. Campbell, Mrs. Charnock, Mr. and Mrs. C. A. Clarke, Messrs. Graham Clarke, C. T. I. Garner, J. W. Goodwin, Theodore Gregory, F.C.A., J. Howard Hall, Miss A. E. Law, Mr. D. A. Little, Mrs. Lyde, Messrs. W. A. M'Grath, F. B. Osborne, M.A., T. W. F. Parkinson, M.Sc., F.G.S., Captain W. Robinow, M.C., Mrs. T. W. Sowerbutts, Mrs. Stordy, Messrs. E. Swithenbank, J.P., W. H. Ward, Mrs. Wilkinson, Mr. J. A. Wilson, and the Secretary.

The Chairman regretted that they had to commence with a great disappointment, in that the Lord Mayor, Alderman Fox, who was to have presided, had received a summons requiring his presence elsewhere. By his secretary he sent an apology for his absence, and said that of all the Societies in Manchester he would have most preferred to attend that Society's meeting. But circumstances were too strong for him, and he had had to go.

The Secretary read letters of apology for absence. He stated that Mr. Harry Nuttall, J.P., F.R.G.S., wrote from Walton-on-the-Hill to say that he had only just returned from the United States, and could not possibly attend that meeting. Mr. Nuttall added : "I have pleasure to hear that you are doing well in the matter of members, and trust it will be continued with success." Col. H. T. Crook, D.L., V.D., was to have also been at the meeting, but had written to say that he had to go to Tenby in consequence of the death of his sister-in-law. Further apologies were received from the Vice-Chancellor of the University (Sir H. Miers), Mr. T. A. Edwards, F.R.G.S., and Mr. Arnold Williams.

The minutes of the 34th annual meeting having been adopted, the Chairman said he had pleasure in calling upon their Honorary Treasurer to move the adoption of the report and balance-sheet. "I may say," added Mr. Mellor, "that it is with very great delight that I see him here to-day because, as many of us on the Council know, he has been confined to his house as the result of a painful accident. I am sure it is at some considerable effort to himself that he is able to be here this afternoon."

## REPORT OF THE COUNCIL.

### FOR THE YEAR ENDED DECEMBER 31ST, 1919.

THE Council have the pleasure to report that the Society has made considerable progress in recovering the loss of ground due to the War.

The attendance at the meetings has shown a satisfactory increase, and the lectures delivered have again been highly appreciated by the members. The following is the list of the Lectures given :—

"In the Guy Mannering Country." Rev. A. W. Fox, M.A.
"Cycling in Lakeland." Mr. Ewin Pickstone.
"The Yorkshire Dales." Mr. J. Ernest Phythian.

"A Corner in Devon." Rev. A. W. Fox, M.A.
"The History of Manchester in Pictures." Mr. J. G. Birkby, M.A.
"The Problems of Alsace-Lorraine." Lieut. L. Righyni.
"Awheel in North France before the War." Mr. J. G. Birkby, M.A.
"3,000 Miles of Battle Front." Mr. Elisha Bardsley, J.P.
"Venice: the Sea-girt City." Mr. J. Ernest Phythian, M.A.
"Italy's Glorious Struggle for Unity." Rev. J. H. Burkitt.
"Journeys among the Swiss Alps." Mr. Charles Sutton.
"The Fascination of Belgium." Miss L. Edna Walter, M.B.E., H.M.I., B.Sc.
"1,500 Miles through Great Russia, Little Russia and the Caucasus." Mr. Wm. Barnes Steveni, M.J.I.
"Jugo Slavia; a new European State." Rev. Alexander Taylor, M.A.
"Palestine in Peace and War." Miss Sophie Nicholls, M.A., F.R.G.S.
"In the Track of Allenby's Army." Miss Sophie Nicholls, M.A., F.R.G.S.
"The Indian Deccan: or South India." Prof. P. M. Roxby, F.R.G.S.
"British Malaya: a story of Empire." Dr. W. E. Gibbs, D.Sc.
"Siberia's Place in Asia." Col. H. G. C. Swayne, C.M.G., R.E.
"Some Impressions of Northern China." Prof. P. M. Roxby, F.R.G.S.
"Temples and Shrines of Japan." Mr. John Hilditch, F.R.G.S.
"Mauritius." Mrs. Keith Adams.
"With Arabs and Moors in North Africa." Mr. Henry Crowther, F.R.M.S.
"Our East Indian Possessions." Rev. Arthur B. Fisher, C.F., F.R.G.S.
"South Africa." Very Rev. W. S. Swayne, B. D., Dean of Manchester.
"Progress of South Africa under the Union." Mr. T. A. Edwards, F.R.G.S.
"Canada: its Progress and Development from Confederation." Mr. R. A. Staniforth.
"History and Associations of the North American Indians." Alderman J. R. Bagdale, J.P.
"Round and About Greater New York." Mr. J. Herbert Cook.
"Our Colonies, Their People and Their Products." Mr. Henry Crowther, F.R.M.S.

The Journal for 1918 (Volume XXXIV) was only published at the end of the year in consequence of various special circumstances which the Council trust will not be recurrent.

Considerable additions have been made to the Library and Map Collection, and it is encouraging to find that the members are making an increasing use of the books and maps placed at their service.

The thanks of the Council are tendered to the Victorians for their valued services during the year, in the delivery of lectures and in other ways.

The loss of members by death during the year has been exceptionally serious, the Society having to mourn the passing away of the Chairman of the Council, Mr. F. Zimmern, as well as the Secretary, Mr. Harry Sowerbutts, whose places will be difficult to fill. The following is the complete list :—

Mr. Wm. Ashworth, F.C.A.
Mr. George Atkinson, F.R.G.S.
Rt. Hon. Louis Botha (Honorary).
Mr. Henry Briggs.
Hon. Alfred Deakin (Honorary).
Mr. Ernest Frank.
Mr. F. G. Goodbehere.
Mr. Joseph Gregory.
Mr. Wm. Hawkins.
Mr. Robert Huntbach.
Sir W. Macgregor, G.C.M.G. (Honorary).
Mr. Alexander Neil.
Mr. James Smith.
Mr. Harry Sowerbutts, A.R.C.Sc.
Mr. R. B. Stoker, M.P.
Dr. R. Swallow (Honorary).
Mr. John Webster.
Mr. Thomas Wilkinson.
Mr. Maurice Wilks.
Mr. T. G. Winstanley.
Mr. F. Zimmern, F.R.G.S.

Mr. Winstanley and Mr. Zimmern were original members of the Society.

The following is the final list of those members who have served in His Majesty's Forces during the War, so far as the Council is aware :—

Colonel John Ainsworth, C.B.E., C.M.G., D.S.O.
Colonel E. W. Greg, J.P., C.C., F.R.G.S.
Colonel S. L. Mandleberg, J.P.
Lieut.-Colonel A. England, R.A., D.S.O.
Lieut.-Colonel M. Gamble, R.A.M.C., M.D.
Major P. K. Glazebrook, M.P. (Killed in Action.)
Major E. Johnson, J.P.
Major J. Nall, D.S.O., M.P.
Major E. Keith Roach.
Capt. W. Morton Johnson, F.R.G.S. (Killed in Action.)
Capt. L. E. Mather, F.R.G.S.
Capt. G. R. Mellor, M.C.

Capt. W. Robinow, M.B.E., M.C.
Capt. R. W. Swallow, B.Sc.
Capt. G. R. Swaine, F.R.M.S.
Capt. Norman Zimmern, M.C.
Lieut. W. L. Flinn.
Lieut. C. V. Groves, R.N.
Sub-Lieut. H. C. Handcock, R.N.R.
Staff Sergt. H. Shorrocks.
Dr. Edgar Grey.
Mr. W. S. Ascoli, F.R.G.S.
Mr. H. S. Beck.
Mr. F. Clay.
Mr. H. Green, M.A.
Mr. Harry Herd. (Died during Training.)
Mr. Arthur Holt.
Mr. B. Jordan.
Mr. E. Lightowler.
Mr. W. R. Shaw.
Mr. T. H. B. Sowerbutts.
Mr. Charles Sutton.
Mr. Arnold Williams, A.C.A.
Mr. A. W. Wood.
Mr. W. D. Woods.

Mr. Harry Nuttall, J.P., F.R.G.S., has intimated his desire to be relieved of the office of President, which he has held for the past ten years. The Council desire to record their great regret, and to express the gratitude of the members for the many valued services he has rendered to the Society.

The Secretary was appointed delegate to the British Association Meeting at Bournemouth, where he read a paper prepared by the Honorary Secretary, Mr. Parkinson, on Geography in Higher Education. His report appears in the Journal, Volume XXXV, but it may be stated here that in consequence of that paper a resolution was passed asking the Board of Education to cause an inquiry to be made into the position of Geography in all branches of Higher Education. This was followed up by a resolution of your Council in the following terms:—

> "That the Council of the Manchester Geographical Society respectfully suggests to the President of the Board of Education the urgent desirability of appointing

> a Departmental Committee to inquire into the position occupied by Geography in the Educational System of the Country, and to advise how its study may best be promoted in schools of all types, including Continuation Schools, Secondary Schools, Universities, and other Institutions for Higher Education."

This was sent to the President with a suggestion that Mr. Parkinson would be a particularly suitable member to co-opt on such Committee.

The President of the Board of Education while expressing his agreement with the views set forth thought the time inopportune, having in view the other enquiries which are proceeding and the large amount of extra work entailed by recent legislation.

In response to an appeal by Mr. Hy. Guppy, M.A., of the John Rylands' Library, a complete set of the Journal of this Society (34 volumes) has been presented as a contribution towards the reconstruction of the Library of the University of Louvain.

The Accounts for 1919, with the certificate of the Honorary Auditor, are appended.

Reference to the Revenue Account will show that the deficit for the year is £179 1s. 1d. This is due partly to exceptional circumstances, but the position is sufficiently serious to have caused the Council no slight anxiety. To prevent the recurrence of this state of affairs, your Council recommend the increase of the Annual Subscriptions, which will necessitate an alteration of the Rules, and they take the opportunity, at the same time, to suggest further amendments which will be submitted to the Annual Meeting, and which they trust will work towards the future benefit of the Society. The greatly needed decoration of the premises has not yet been undertaken, for lack of the necessary funds, and the Council trusts that by a further increase in the membership, or by Special Donations, or both, they may soon be able to have this work done.

The net increase in the membership for 1919 is 27. As many new members only joined towards the end of the year, the financial benefit of their accession will not be felt until 1920. The frequently expressed aspiration of the President for a membership of 1,000 is still to be realised, and can only be attained by the hearty co-operation of all the members.

# REVENUE ACCOUNT.

## YEAR ENDING DECEMBER 31st, 1919.

*Dr.*

| | £ | s. | d. |
|---|---|---|---|
| To Expenses of Meetings ... ... ... ... ... | 119 | 5 | 8 |
| ,, Journal, Vol. XXXIV, *less* Sales and Advertisements | 82 | 6 | 8 |
| ,, Rent, Lighting and Insurance ... ... ... ... | 133 | 7 | 8 |
| ,, Salaries ... ... ... ... ... ... ... | 130 | 10 | 0 |
| ,, Wages ... ... ... ... ... ... ... | 105 | 14 | 1 |
| ,, Sundry Expenses ... ... ... ... ... ... | 43 | 14 | 7 |
| ,, Commission and Expenses—New Members and Collection of Subscriptions ... ... ... ... | 3 | 10 | 7 |
| ,, Books, Maps, Binding, &c., Library ... ... ... | 1 | 15 | 6 |
| ,, Education Committee ... ... ... ... ... | 1 | 9 | 6 |
| ,, Repairs ... ... ... ... ... ... ... | 0 | 8 | 0 |
| | £622 | 2 | 3 |
| To Balance brought down ... ... ... ... ... | 146 | 13 | 1 |
| ,, Grant to Widow of late Secretary ... ... ... | 40 | 0 | 0 |
| | £186 | 13 | 1 |

*Cr.*

| | £ | s. | d. | £ | s. | d. |
|---|---|---|---|---|---|---|
| By Members' Subscriptions :— | | | | | | |
| Life Members (Transferred to Revenue Account) ... ... ... ... | Nil | | | | | |
| Ordinary Members ... ... ... | £402 | 3 | 0 | | | |
| Associate ,, ... ... ... | 60 | 7 | 6 | | | |
| Affiliated Societies ... ... ... | 10 | 10 | 0 | | | |
| | | | | 473 | 0 | 6 |
| ,, Bank Interest ... ... ... ... ... ... | | | | 2 | 8 | 8 |
| ,, Deficit on year carried down ... ... ... ... | | | | 146 | 13 | 1 |
| | | | | £622 | 2 | 3 |
| By Donations as under :— ... ... ... ... ... | | | | 7 | 12 | 0 |
| ,, Balance deficiency for year ... ... ... ... | | | | 179 | 1 | 1 |
| | | | | £186 | 13 | 1 |

| | £ | s. | d. |
|---|---|---|---|
| Ainsworth, Col. John, C.B.E., C.M.G., D.S.O., .. | 2 | 0 | 0 |
| Bradshaw, W., .. .. | | 5 | 0 |
| Crook, Col. H. T., D.L. V.D. .. .. .. | | 10 | 6 |
| Davies, C. J. .. .. | | 10 | 6 |
| Ellinger, M. .. .. | | 5 | 0 |
| Elliot, W. .. .. | | 5 | 0 |
| Garnett, Mrs. C. .. | | 9 | 0 |
| Jepson, N. .. .. | | 5 | 0 |
| Kewley, Miss. .. .. | | 5 | 0 |
| Qualtrough, Miss K. F.R.G.S. .. .. | 1 | 1 | 0 |
| Robinow, Capt. W., M.C. | | 5 | 0 |
| Spencer, W. .. .. | 1 | 1 | 0 |
| Stowell, H. .. .. | | 5 | 0 |
| Urmston, R. .. .. | | 5 | 0 |

NOTE.—The Furniture, Fittings, Books, Maps, Lantern Slides, Stock of Journals, etc., which are insured for £1,000, are not included as Assets in the Balance Sheet. There are 52 Life Members (including one Honorary), and the Subscriptions of 28 of this number have been taken as Income in years prior to 1908.

## BALANCE SHEET, DECEMBER 31st, 1919.

| LIABILITIES. | | £ s. d. |
|---|---|---|
| To Sundry Creditors ... ... ... ... ... ... | | 163 4 5 |
| ,, Subscriptions Paid in Advance :— | | |
| Ordinary Members ... ... ... | £66 3 0 | |
| Associate ,, ... ... ... | 8 18 6 | |
| | | 75 1 6 |
| ,, Life Membership Reserve Account ... ... ... | | 241 10 0 |
| ,, Kirkpatrick Endowment Fund ... ... ... ... | | 50 0 0 |
| ,, Eli and Emma Sowerbutts Memorial Fund ... ... | | 150 0 0 |
| ,, John Walkden Memorial Fund : Balance Unexpended | | 5 1 9 |
| ,, Investment Depreciation Account ... ... ... | | 451 11 4 |
| ,, Balance :— | | |
| From last Account ... ... ... | £399 1 3 | |
| *Less* Deficit Revenue Account, 1919 | 179 8 1 | |
| | | 220 0 2 |
| | | £1,356 9 2 |

| ASSETS. | | £ s. d. |
|---|---|---|
| By 172 Shares of £10 each fully paid in M.G.S.B. Co., Ld. | | |
| 62 Purchased ... ... ... ... | £211 11 4 | |
| 110 Presented ... ... ... ... | 1,100 0 0 | |
| | | 1,311 11 4 |
| ,, Subscriptions in Arrear :— | | |
| Ordinary Members ... ... ... | £17 17 0 | |
| Associate ,, ... ... ... | 3 13 6 | |
| | | 21 10 6 |
| ,, Cash in Bank ... ... ... ... | £8 5 4 | |
| ,, Cash in Hand ... ... ... ... | 12 0 6 | |
| | | 20 5 10 |
| ,, Accounts owing ... ... ... ... ... ... | | 3 1 6 |
| | | £1,356 9 2 |

### AUDITOR'S CERTIFICATE.

I have audited the above Balance Sheet, and certify same to be correct. I have examined and found to be in order the Shares in the Manchester Geographical Society Building Company, Limited.

JOHN THOMASON,
*Hon. Auditor.*

1st April, 1920.

Mr. David A. Little appreciated the Chairman's remarks. In moving the adoption of the report of the Council and the balance-sheet for 1919, he said that one of the astonishing things to him had been that during the whole process of the war the Manchester Geographical Society had continued its work with a great amount of satisfaction, and was not in a worse position to-day than they expected they might be. During the session the attendance at the lectures had increased, and that, he thought, was a good sign of the interest which the Society brought to the common life of the city—that the people found it a most delightful way of spending an evening, and one well worth while being patronised by a greater number of people who had such benefits placed before them at a reasonable cost. The deaths of members each year had a tendency to weaken the Society from a financial point of view, and during the year under review the list of deaths was a very extended one. "I would," said Mr. Little, "like to refer to the death of Mr. Zimmern. He was a great friend of the Society, constant in his endeavours to uphold the usefulness of the work we have in hand. A member of the old German colony in Manchester, he was one who did a great amount of public work without stint." Another death that was referred to was that of Mr. Harry Sowerbutts, and it was difficult to say what the Society had lost by his death. He followed in the footsteps of his father in increasing interest in the work of the Society, and was a most conscientious Secretary—the best one, Mr. Little thought, he had ever known. But he had been taken away at a comparatively early age, and at very short notice. They would not be surprised that during the war, with the resignations and the deaths of members, their accounts had got a little behind. The amount of the deficit was £179, but they were hoping, now things were settling down after the war, they would have a great increase in membership.

The proposition was seconded by Mr. J. E. Balmer, F.R.G.S. He expressed the view that the Society was not supported sufficiently by merchants and others who were interested in the matter of trade. He had been associated with the Society for more years than he liked to say, and its work was most excellent. It was never more necessary than to-day that they should understand geography, for the war had changed the map of Europe, and our lads wanted to know where the boundaries were. It seemed to him, therefore, that the Society should supply this information.

The resolution was unanimously adopted.

The Chairman said alterations in the rules were proposed which the Council believed would be for the better working of the Society. He would therefore ask Mr. Clarke to move the resolution with regard to it.

Mr. C. A. Clarke proposed : "That the rules be altered so as to incorporate the amendments and additions as printed on the back of the notice calling this meeting." For a long time past, said Mr. Clarke, they had had one president year by year. It was thought advisable to make some change, so that the president would not be eligible for re-election after serving three years in that position. Another change was that subscriptions should be raised in accordance with the rise in price of everything else. Mr. Clarke then formally moved the adoption of the alterations of rules as under. (The amendments or additions are in italics) :—

RULE 18.—An ordinary member shall pay an annual subscription of *£1 10s. 0d.* or he may compound by one payment of *£15 0s. 0d.* An associate member shall pay an annual subscription of *£0 15s. 0d. Students under the age of twenty-one years may be admitted to the meetings, and accorded the use of the Library, Map Room, &c., at an annual fee of £0 10s. 6d.* The Society's year shall begin on the first day of January.

RULE 10—Add :—

*The President shall not be eligible for re-election after having occupied such office for three years consecutively but upon retiring from office shall be styled "Past President" and shall be ex-officio member of the Council so long as he remains a member of the Society.*

RULE 38.—Add :—

*The Chairman of the Council shall not be eligible for re-election after having occupied such office for three years consecutively.*

RULE 48.—The accounts shall be audited annually by *a professional accountant or* two members who shall be elected at the Annual Meeting or at an ordinary meeting at least one month before the Annual Meeting.

RULE 52.—Add new rule:—

> *No alteration shall be made in these rules except at the Annual Meeting of the Society, or at a Special Meeting called for that purpose by fourteen days' notice, specifying the proposed change, and agreed to, in either case, by three-fourths of the members present.*

Capt. W. Robinow, M.C., seconded.

Mr. W. Burton asked if they could be guided by any information as to the wisdom of raising the subscriptions. He admitted why they were doing it, but was it wise, after all? Would it keep members away, and prevent new members joining?

The Chairman said it had ben thrashed out at very considerable length by the Committee and by the Council. "I will, however, ask the Secretary to give you further details with regard to it."

The Secretary said that apart from extraordinary matters they were £146 to the bad on the year's working. For the current year they would not be so bad as that, because they had an increase of between 40 and 50 members. But even if they went on like that for three or four years they would only then begin to overtake their expenditure. The Council had gone into it fully, and they felt that by increasing the subscription by about 40 per cent. it would only be a moderate increase for these days. Forty per cent. might not be sufficient, but they hoped to combine with it a still further increase of membership. He (the Secretary) had only one case of any objection, and that member did not put down in black and white the cause of his resignation as being due to the increase in subscription. People he had talked to,—and were, he believed, going to become members, said 30/- was quite little enough for the services rendered. He had heard it said by members and others that the guinea paid to the Geographical Society was the cheapest guinea's worth in Manchester. They might lose a few, but not an appreciable number of members in consequence of the increase from a guinea to 30/-; but the increase proposed was the unanimous recommendation of the Committee and the Council.

Mr. F. B. Osborne, M.A., said that if they did not increase the subscription they would have to give the members less for their money—not the same number of lectures or the same efficiency. The increased subscription was a very much smaller amount than was paid by members of some smaller societies. Friends of his said they knew of no society where they got so much money's worth. He did not think there would be any loss; rather he thought they would increase the membership, and they should give them even better value than now. They should try, if they could, to accumulate some reserve, so that they could take risks, and get gentlemen of some position in the geographical world to give them lectures. The first thing, of course, was to get their accounts into a satisfactory state, and it seemed to him necessary to make this small increase, and he strongly supported it.

Mr. Burton expressed satisfaction with the information, and the resolutions were carried.

The Secretary said that with regard to the nominations for the Officers and Council for the coming year, they would see that there was no necessity for any contest. Mr. Mellor had been nominated as President. Mr. Nuttall, who had served the Society so well for so many years, had taken the post of Past-President. There were a few changes in the list, as there must always be because of the new people coming in and others dropping out. Mr. Alan G. Ogilvie, the new reader in geography at the University, who had taken the place of Mr. McFarlane, immediately joined the Society, and came on the Council and the Executive Committee. He had already given them a lecture. They were keeping in touch with the geographical side of the University, and they hoped it would continue.

Mr. W. A. M'Grath moved, "That the Officers and Council, as nominated, be and are hereby elected." It was, he said, the greatest pleasure to the members of the Manchester Geographical Society to see Mr. Mellor appointed President. If there was one member of the Society who had made himself not only popular, but had rendered the greatest services to the Society, it was Mr. Mellor. No one, in the opinion of the members, merited it more than he, and he felt glad and sure that Mr. Mellor would be a very worthy successor to Mr. Harry Nuttall. Some of them were sorry Mr. Nuttall had felt it wise to retire; personally, he did not like to see officers at the head of affairs taking a back seat. Mr. Nutall, however, quite naturally felt that it was time for him to have a little rest and give way to others. Mr. M'Grath said he was glad to see the names that appeared on the list of officers, because he thought they should get as many nominated in order to secure a greater interest in the Society.

Mr. W. H. Ward seconded, and associated himself with the remarks about Mr. Mellor.

The following were then unanimously elected as Officers and Council for 1920–1921:—

**Patron.**

HIS MAJESTY THE KING.

**President.** Mr. E. W. MELLOR, J.P., F.R.G.S., F.R.P.S.

**Past-President.** Mr. HARRY NUTTALL, J.P. F.R.G.S.

**Vice-Presidents.**

The Right Hon. the EARL OF DERBY, K.G., G.C.V.O.
The Right Hon. LORD EGERTON OF TATTON.
The Rt. Rev. the BISHOP OF SALFORD.
Sir HENRY A. MIERS, D.Sc., F.R.S., Vice-Chancellor of the University.
The Right Hon. the LORD MAYOR OF MANCHESTER.
His Worship the MAYOR OF SALFORD.
The Right Hon. Sir WM. MATHER, J.P.
Sir G. W. AGNEW, Bart.
Sir E. TOOTAL BROADHURST, Bart., D.L., J.P.
Sir C. W. MACARA, Bart., J.P.
Sir JOHN S. RANDLES, M.P.
Sir H. F. DE TRAFFORD, Bart.
Captain W. C. BACON, Chairman Ship Canal Company.
Mr. J. E. BALMER, F.R.G.S.
Colonel H. T. CROOK, D.L., V.D.
Hon. Prof. Sir W. BOYD DAWKINS, J.P., F.R.S.
Mr. HENRY FILDES, M.P.
Colonel E. W. GREG, J.P., C.C., F.R.G,S.
Mr. THEODORE GREGORY, F.C.A., J.P.
Mr. J. S. HIGHAM, J.P.
Mr. EDWARD HOPKINSON, M.P., D.Sc.
Mr. T. O. JACOBSEN, J.P., L.C.C., F.R.G.S.
Mr. J. MACFARLANE, M.A., M.Com., F.R.G.S.
Major JOSEPH NALL, D.S.O., M.P.
Mr. GEORGE THOMAS, J.P.

**Trustees.**

Mr. HARRY NUTTALL, J.P., F.R.G.S.
Mr. SIDNEY L. KEYMER, F.R.G.S.
Mr. E. W. MELLOR, J.P., F.R.G.S., F.R.P.S.

**Hon. Treasurer.** Mr. DAVID A. LITTLE.

**Hon. Editor.** Mr. EGBERT STEINTHAL.

**Hon. Secretaries.**

Mr. RICHARD KAY, F.R.G.S.
Mr. T. W. F. PARKINSON, M.Sc., F.G.S.

**Hon. Secretary (Victorians).** Mr. C. A. CLARKE.

**Council.**

Mr. W. S. ASCOLI, F.R.G.S.
Miss S. A. BURSTALL, M.A.
Mr. C. A. CLARKE.
Mr. C. COLLMANN.
Mr. T. A. EDWARDS, F.R.G.S.
Mr. GEORGE GINGER.
Mr. J. HOWARD HALL.
Mr. H. C. MARTIN, F.R.G.S.
Captain L. E. MATHER, F.R.G.S.
Rev. J. G. MAUDE, M.A.
Mr. ALAN G. OGILVIE, O.B.E., M.A., B.Sc., F.R.G.S.
Mr. F. B. OSBORNE, M.A.
Mr. EWIN PICKSTONE.
Miss KATE QUALTROUGH, F.R.G.S.
Mr. J. R. RAGDALE, C.A., J.P.
Mr. ALFRED REE, Ph.D.
Mr. J. STEPHENSON REID.
Captain WM. ROBINOW, M.B.E., M.C.
Mr. J. WALTER ROBSON, J.P.
Mr. R. A. STANIFORTH.
Miss L. EDNA WALTER, M.B.E., B.Sc., H.M.I.

Mr. Mellor then gave his Presidential address, which he illustrated by means of a large map of Africa. He said :—

Fellow members of the Manchester Geographical Society,—I esteem it a very high honour indeed that you have done me in electing me as President. It is a matter of very great regret to myself that my good friend—and colleague, I may say—of this Society for many years, Mr. Nuttall, is prevented from being here to-day, and it is with extreme diffidence that I attempt to follow in his shoes. He has made you a capital President. I think, also, of the great names of those who have filled the position of President here. Why, the King himself was President when he was Duke of York and subsequently Prince of Wales. I think your first President was the Duke of Devonshire. So one may step into this position with rather a considerable amount of diffidence, and I am afraid it will be difficult to follow adequately in the steps of these great men.

The Report of the Council bears evidence of the large amount of valuable work done by the Manchester Geographical Society during the twelve months under revision to-day, and clearly demonstrates that it is a live and progressive Society.

Of the domestic concerns of the Society, it is worthy to note that one of the members of the Council, Mr. Alan Ogilvie, Reader in Geography at the University, contributed a valuable paper to the Royal Geographical Society on the "Geography of Macedonia," a paper to which considerable prominence has been given. Another item of domestic interest is the fact that our Secretary has been appointed Vice-President of the Conference of Delegates of the British Association this year.

Much interest was recently aroused in the endeavour to traverse the continent of Africa from north to south, by attempted aeroplane flights from Cairo to the Cape. Let me draw your attention to these efforts, which, for their gallantry alone, if for nothing else, deserve attention. The flight on which public attention was mostly concentrated, and was the first to be put into execution, was that organized by the proprietors of the "Times" newspaper.

What was the object of the organizers? Briefly this: To test the practical utility of an air route from Cairo to the Cape. For this purpose they sent as a passenger in the aeroplane Dr. Peter Chalmers Mitchell, C.B.E., a man of high scientific attainments, and no longer young, and whose business was to make zoological and other scientific observations during the course of the journey, a journey which was to be in no sense a racing or spectacular stunt, but a practical demonstration.

Splendid preparation was made by the Air Ministry, who sent detachments of men to clear and arrange no fewer than 42 landing grounds. Yet the problems were many and serious. Let us glance at a few of them. The total distance is 5,200 miles; the average distance between landing grounds was 124 miles, though some of them were no less than 300 miles apart, and they had to land before nightfall; they could not fly at night. A tropical thunderstorm, a faulty magneto, a leaking petrol-tank, or any mishap to engines or control gear, might at any time compel a forced landing; and what if this took place remote from those landing grounds spread so far apart? What sort of country were they going to face? Let us try to realize it.

The first six hundred miles of the journey over Egypt would be simple; they would be guided by the broad waters of the Nile, but entering the Sudan at Wady Halfa, they would cross the Bayuda desert, perhaps most commonly known as the Nubian desert, the home of Besharin Arabs and other nomad tribes, and where it is said "the soil is like fire, and the wind like a flame," where petrol would rapidly evaporate, and where water jackets might soon leak from heat expansion. Beyond this desert they would strike the Nile valley again.

About 200 miles above Khartum, they would enter the country of the Nilotic negroes. On the right bank of the White Nile are the Dinkas, people of uncertain temper, who trim their hair to resemble a cock's comb, and plaster it with dung. Some 200 miles further on, on the left bank of the Nile, are the Shilluks, gentry clothed only with a spear, and whose headquarters are near Kodok, formerly Fashoda. Then they would come to the Sudd region. The name sudd is Arabic for "damming-up," and it is no misnomer, for the floating vegetation here dams up and obstructs navigation, and converts the White Nile into some 35,000 square miles of swamp, the home of malarial fever, and infested with hungry crocodiles and savage hippopotamus and rhinoceros, affording little foohold to man. Fancy a forced landing in the Sudd—neither men nor machine would have much chance.

Through Uganda to the Victoria Nyanza the White Nile ceases to be a guide; the river is occupied with rocks and rapids, and steering must be done by compass and reckoning. Forests, the home of all kinds of wild animals, and elephant grass, 20 ft. high, make difficult the identification of landmarks. Along the cleft which forms the Congo-Uganda boundary are active volcanoes, which must be avoided, as they would probably cause atmospheric disturbances dangerous to flying men. Care, too, must be taken not to get too far to the west, for there in equatorial Africa, a forced landing might place the airmen among tribes addicted to cannibalism; for example, the Niam-Niams, west of Nimule, are said to have eaten some of their visitors.

Such are some of the problems which face a journey in the air from Cairo to the Cape. I do not think I need say more to convince you of the courage, intrepidity, skill and perseverance of the men who were the pioneers of this truly great and splendid adventure.

Now what did happen? What was their experience? And here I am largely indebted to the narrative of Dr. Chalmers Mitchell, and his colleagues.

Let us follow briefly the journey of the "Times" aeroplane. It was a machine similar to that in which those Manchester heroes, the late Sir J. Alcock and Sir A. W. Brown flew across the Atlantic in June of last year. Well, the "Times" machine took 10 days to fly from England to Cairo, being delayed by storms, and between Lyons and Marseilles the pilots found it so cold that their fingers were nearly frozen, and they were unable to write. More delay occurred at the Heliopolis Aerodrome, a short distance outside Cairo, in getting rid of the desert sand, which the stormy winds had caused to insinuate itself into the machine to a remarkable extent; also in adjusting the engines and machine for the tropics.

A successful start was made from Cairo on the morning of February 6th, but in the afternoon a cylinder jacket began to leak, and they had to descend at Luxor. After spending an hour and a half in patching up the leak, they flew on to Assuan, losing cooling water all the way, but achieved 425 miles on their first day's African flight. All the next day was spent in overhauling the engines and soldering up the leak, and at night they seem to have been disturbed by jackals. Next day, February 8th, they were off again, heading for Khartoum, but the engines soon began to overheat again, and two descents had to be made that day, to doctor the engines, while crossing the Bayuda Desert. They complain that the atmosphere was like a stokehole, and that the glare from the sun on the desert made landing difficult. Contrast that with the nearly frozen fingers of about a fortnight previously. However, they managed to reach Khartoum that night with the expiring daylight, and nearly exhausted—1,043 miles from Cairo. The whole of the next day and night was devoted to dismantling, repairing and refixing the engine cylinders.

They started again next morning, February 10th, from Khartoum, and soon passed the Kosti Bridge—this is the most southerly point at which the Sudan Government Railway crosses the White Nile, and in two hours' time reached Jebelein, where they found another leak. After patching that up, they made another start, but had to descend on a dangerous landing in the bush at Reuk, only a comparatively short distance away. When I lectured to the Society on this part of Africa some years ago, I showed you something of this place, Reuk, and its inhabitants. Here the "Times" flying men camped round a fire for the night, and speak of elephants, hippopotamus, and leopards.

Engine trouble again, as bad as ever, sent the "Times" men back to Jebelein, where they spent three days patching up and repairing engines. On February 14th they started again, and safely crossed that very dangerous region of the Sudd. Here they had to steer by compass, as they lost the course of the Nile in this vast swamp, and the smoke from bush fires and haze spoiled the visibility. Engine trouble began again, and the great heat caused their petrol to very rapidly evaporate. However, on the following day they reached Mongalla, 1,789 miles from Cairo, at the extreme south of the Sudan, and nearly on the border of the Uganda Protectorate. I have given you enough of the history of this flight to show you the hard work of these courageous men. The intense heat of equatorial Africa seems to have adversely affected their machinery all the time. Owing to the great heat the mechanics could only work in the morning; they had restless nights. For instance, they record that at Nimule, in Uganda, they slept round a camp fire, that their repose was disturbed by lions, and that they had to make business with the fire to frighten the lions away. Engine trouble persistently dogged them day after day, until on February 27th, just when they had risen from the ground at Tabora, in the Tanganyika Territory, formerly German East Africa, 2,628 miles from Cairo, the "Times" Aeroplane crashed, running into the bush and huge ant-hills, wrecking the machine, and so their gallant effort ended, fortunately without serious personal injury or loss of life.

Four days after the "Times" machine, another aeroplane, piloted by two South African officers, Colonel Van Ryneveld and Capt. Brand, started from Cairo bound for the Cape. This machine, from the metallic lustre of its paint, was called the "Silver Queen." The following day, Feb. 11th, this machine crashed at Korosko, a rock-like cliff on the Nile between the first and second cataracts, about 500 miles south of Cairo. These officers managed to salve the engines of the wrecked aeroplane, and carried them back to the Aerodrome at Cairo, where the engines were fitted to an identically similar machine, which was called "Silver Queen II."

On February 22nd, twelve days after the first Silver Queen started, the second Silver Queen started from Cairo, and after a successful flight of 617 miles, arrived at Wady Halfa that evening; six days later, on February 28th, this machine passed over the wreck of the "Times" machine at Tabora without ever seeing it. Colonel Van Ryneveld and his colleague had similar experiences from leaking water jackets, and other engine troubles, as had the pilots of the "Times" machine, but perhaps not quite so badly. After completing some 4,000 miles of the journey, "Silver Queen II." crashed to a wreck at Buluwayo, in Southern Rhodesia, again fortunately without personal injury or loss of life. Colonel Van Ryneveld and Capt. Brand remained eleven days at Buluwayo while the Union Government sent them another aeroplane to complete their journey. This new machine, a Voortrekker, enabled these gallant officers to complete their journey by air in another three days to Capetown, where they arrived on March 20th.

Colonel Van Ryneveld and Captain Brand may thus claim the proud distinction of being the first two men to travel all the way by air from England to Capetown. They required, however, three aeroplanes to do it, and it occupied them, I believe, seven weeks.

About this period two other aeroplanes attempted without success to fly from Cairo to Capetown. On the 26th of Feb. a R.A.F. service machine, piloted by Major Welsh, came down disabled at El Derr, 15 miles south of Korosko, between Assuan and Wady Halfa. And on the 25th of February, a Handley-Page machine, piloted by Major Brackley, crashed at Shereik, 76 miles north of Atbara; fortunately none of the crew were hurt.

The feat, then, of taking the same aeroplane from Cairo to the Cape is still to be accomplished. Nevertheless, the feats of flying which we have been considering are very far indeed from being wasted efforts. Very much scientific information has been obtained. Time will not allow me to give you details of this. Suffice it then to mention only two instances: First, in his flight over the unsurveyed and unknown area of the Bayuda Desert, Dr. Chalmers Mitchell discovered a large volcanic field, of which there does not appear any previous knowledge. This is something new, and it is a discovery which will enable geologists to calculate with a greater degree of exactness than heretofore the age of this African portion of the earth's crust. Secondly, Dr. Chalmers Mitchell reports that the Victoria Nyanza is spreading its north-east and east shores as a pool spreads when buckets of sand are poured in. In other words, the Victoria Nyanza is extending its area, because of silting up and filling with beginnings of Sudd Islands. From the air submerged islands and promontories were everywhere visible, giving a drowned aspect to the country.

Now as to the mechanical aspect of the question: It was found that owing to the intense heat of equatorial Africa, and the consequent reduction of the lifting power of the atmosphere, the greatest difficulty was experienced in getting the aeroplane started away—for instance at Nimule, in Uganda, the "Times" machine could not rise more than 200 or 300 feet above the ground, and it was found necessary to stagger back to the aerodrome and wait there until the very early morning when the air became sufficiently cool. This perhaps indicates that an increase of wing surface is necessary for flight in such climates. Then, too, aeroplane engines are necessarily kept as light in weight as possible; there is no superfluous metal, and the wear has been so great, in this climate and at the velocity at which they run, that it has actually been suggested that the engines should be changed at intervals—an idea highly reminiscent of the old stage-coach changing horses at the various stages. Such replacing of engines while *en route* would be too lengthy an operation for practical business; better than this would be relays of aeroplanes at suitable landing places, where passengers, parcels, and mails could be changed from one aeroplane to another, each one specially adapted for its own section of the route.

Dr. Chalmers Mitchell, as a consequence of his experience, has come to the conclusion, that to establish a mail and passenger air service between the north and south of the African Continent, the principle of relays must be adopted. It is suggested that in this way a flight of 600 miles might be accomplished between stops; but even so it would mean changing trains—I beg pardon—it would mean changing aeroplanes, some eight or nine times between Cairo and Capetown. Just think of the trouble and delay this would cause. It makes one rather sigh for the realisation of Cecil Rhodes' dream of a through railway between the Cape and Cairo. But from what I have seen of the Sudan and know of Central Africa, I fear that dream is a long way from accomplishment. No doubt, however, the designers of aeroplanes and aeroplane engines will be spurred on to devise improvements in the machines, which will enable them to withstand the wear and tear of so exacting a journey, with its tremendous variations of climate and temperature.

Mr. Mellor mentioned several suggestions made with the object of creating a through railway service between Cairo and the Cape, and the use, therein, of ferry steamers on Lake Nyanza and Lake Tanganyika; and, in conclusion, observed: "But enough has been accomplished to prove the truth of the remark of the Prince of Wales at a recent meeting of the Royal Geographical Society, that geography is a great help to the flying men, and that the flying man's efforts are a great help to the knowledge of geography."

The President said they knew that their old and well-tried auditor, Mr. Gregory, who had given his services for about 34 years, was to retire from that very onerous position, and a successor was appointed. The Council felt that they could not part with Mr. Gregory without some slight acknowledgment of his long and valuable services to the Society. So they desired to ask him to accept from the Society a little memento (a silver rose-bowl, bearing the inscription, "Presented to Theodore Gregory, F.C.A., in remembrance of 34 years' honorary service as Auditor to the Manchester Geographical Society, 1885—1919"). Turning to Mr. Gregory, the President said : "I have very great pleasure in handing it to you. I hope you will live for many years to see it grace your home."

Mr. Gregory expressed hearty thanks for the gift, which he said would be a very pleasant reminder of his long connection with the Society. A large amount of devoted service was given by voluntary workers, and, compared with that, what he had given to the Society was really very small. But he valued, none the less, their expression of appreciation of it. Recalling the meeting at which he was first elected an auditor, Mr. Gregory said the chairman was Dr. Casartelli, the present Bishop of Salford, and he thought there were present four or five others besides himself. It was easier, however, to get into the position than out of it, and so it became a sort of habit to elect him. He thought, however, that his time had come, but the connection with the Society had been a very pleasant one. Unfortunately, of the officers of the Society at that time, he was afraid he was the sole survivor. He did not remember if Mr. Nuttall was one. Mr. Steinthal was the chairman, and Mr. E. Sowerbutts was the secretary for the first twenty years. Sir Bosdin and Lady Leech were members, and Lady Leech was a member of the Council for some years. Sir Bosdin studied geography in various parts of the world, and gave them more than one account of his visits, one (Mr. Gregory thought) to Japan, and another to India. One of the lectures given in the first years of the Society's existence was by Mr., and later Sir, H. M. Stanley. This lecture, if he remembered aright, was given in the Free Trade Hall, without any charge, rather to introduce the Society to the City. It was just after Mr. Stanley had returned from his great journey across Africa from East to West, when he followed what Dr. Livingstone thought was the source of the Nile. He heard Stanley give, in the same hall later, his account of how he found Livingstone, and was very much surprised at his appearance then compared with his appearance after he had made that great expedition. "I think," observed Mr. Gregory, "I hardly heard a more bombastic lecturer than he was on the first occasion." The members of that Society had heard many explorers, among them Dr. Nansen and Dr. Peary, of Arctic fame, and Capt. Scott and Sir E. Shackleton of the Antarctic regions. In conclusion Mr. Gregory said he would treasure their present as a remembrance of his association with the Manchester Geographical Society.

Mr. J. Howard Hall moved, Mr. R. Campbell seconded, and it was resolved "that the best thanks of the Society be tendered to Mr. John Thomason, A.C.A., for his services as Hon. Auditor for the past year, and that he be hereby re-elected."

Mr. E. Swithenbank next moved that the thanks of the meeting be given to the Lord Mayor for permitting the Society the use of the room. Mr. Swithenbank contrasted the old style of learning and teaching geography with the present one. He said he at one time fancied himself something in geography, but when he came into contact with members and officials of that Society, and some of the lecturers, he found he was something like an infant in it. He thought the fact that they were granted the use of that room for their meeting indicated that the Society had made progress. People were beginning to see the value of its work. He suggested that as the Lord Mayor had not been able to attend the meeting that he be invited to be present at one of the lectures.

Mr. C. T. I. Garner seconded the resolution, which was carried unanimously.

The meeting then terminated.

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The 1,132nd Meeting of the Society was held on Tueesday, October 5th, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

The Chairman referred to the loss the Society had sustained by the deaths of the Rt. Hon. Lord Egerton of Tatton, Rt. Hon. Sir W. Mather, LL.D., Rev. F. C. Smith, M.A., F.R.G.S., Mr. Marcus S. Bles, J.P., and Colonel W. W. Clapham, and the members present expressed their sympathy and regret in the usual manner.

The election was announced of the following Members :—*Ordinary* : Messrs. Austin Eastwood, F.R.G.S., Wm. Eaves, F.S.A.A., Sir Harold Elverston, J.P., Mr. Thomas Wilson Erskine, Councillor Samuel Finburgh, Messrs. John S. Foster, Richard Martin, Major Joseph Nall, D.S.O., M.P., J. C. Quirk, Mrs. Lily Taylor, Messrs. Arthur Willert, Walter Yates. *Associate* : Mr. Walter Fogg and Miss Ethel Wood.

Captain F. Kingdon Ward, B.A., F.R.G.S., delivered a lecture on "South-East Tibet, and Western Yunnan."

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The 1,133rd Meeting of the Society was held on Tuesday, October 12th, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

Mr. J. G. Birkby, M.A., gave an address on "Paris."

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The 1,134th Meeting of the Society was held on Friday, October 15th, 1920, at 3.30 p.m. The President, Mr. E. W. Mellor, F.R.G.S., F.R.P.S., was in the Chair.

Miss Cecilia Marsh delivered an address on "Glimpses of South Norway."

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The 1,135th Meeting of the Society was held on Tuesday, October 19th, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

The election was announced of the following Members :—*Ordinary,* Rev. Arthur Grime, F.R.G.S., Mr. Ernest C. Hallam, Miss Doris Harrison-Jones, Miss Bessie Lamb, Messrs. Walter Moscrop, Thomas Edwin Sale, Miss Edith Scott, Mrs. Mary E. Spencer, Messrs. E. Raymond Streat, Henry Walker, Mrs. M. A. Wood, Mr. G. N. Wright. *Associate* : Miss E. Foy, Miss H. Gray.

Mr. Thomas E. Green, F.R.G.S., lectured on "Florence, the Beautiful."

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The 1,136th Meeting of the Society was held on Tueesday, October 26th, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

The Rev. A. W. Fox., M.A., gave an address, "In North-Western Donegal."

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The 1,137th Meeting of the Society was held on Tuesday, November 2nd, 1920, at 7.30 p.m. The President, Mr. E. W. Mellor, F.R.G.S., F.R.P.S., was in the Chair.

The death of Mr. James Brown, J.P., was noted with regret.

The election was announced of the following Members :—*Ordinary* : Miss Laura E. Hulton, Mr. Robert Mellor; *Associate* : Miss May Berry, Miss Mary Dickens.

Sir John S. Randles, M.P., addressed the members on his tour, "Round the World by Ceylon, Burma, and Japan."

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The 1,138th Meeting of the Society was held on Tuesday, November 9th, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

The death of Mr. C. E. Reade was noted with regret.

Mr. Percival J. Ashton lectured on the "Historic Scenery of England."

The 1,139th Meeting of the Society was held on Tuesday, November 16th, 1920, at 7.30 p.m. Mr. C. H. Bellamy, F.R.G.S., F.R.Hist.S. (of Tourcoing), presided.

The election was announced of the following members :—*Life* : Mr. W. R. Emmins. *Ordinary* : Messrs. Wm. Andrews, Wm. Hy. Ginn, Wm. Hulme, Joseph Percy Kenyon, Benjamin Lewis, Miss Margaret Parke. *Associate* : Miss M. A. Eccles, Mr. C. W. Kent.

The Rev. A. B. Fisher, C.F., F.R.G.S., lectured on the "Future of East Africa and Uganda."

Colonel John Ainsworth, C.M.G., D.S.O., in moving a vote of thanks, supplemented the lecture by calling attention to some recent developments which had taken place since Mr. Fisher returned.

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The 1,140th Meeting of the Society was held on Tuesday, November 23rd, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

The Rev. James Johnston, F.R.Hist.S., delivered a lecture on "South American Lands, a new World for Trade Conquest."

A vote of thanks was proposed by the Hon. G. W. Chester (Vice-Consul for Brazil).

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The 1,141st Meeting of the Society was held on Friday, November 26th, 1920, at 3.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

Sir Cecil Hertslet, K.B.E., formerly H.B.M. Consul-General for Belgium, delivered a lecture on "The Ruin and Restoration of Belgium."

The Rt. Rev. the Bishop of Salford (Dr. Casartelli), in moving a vote of thanks to the lecturer, also proposed that Sir Cecil Hertslet be elected an Honorary Member of the Society, which was carried by acclamation.

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The 1,142nd Meeting of the Society was held on Tuesday, November 30th, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

The Chairman announced that through the kindness of Miss A. E. Law it had been possible for the Society to forward a complete set of Journals towards the reconstruction of the Library of the Serbian University at Belgrade.

Mr. J. Ernest Phythian, M.A., lectured on "The Roman Wall."

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The 1,143rd Meeting of the Society was held on Tuesday, December 7th, 1920, at 7.30 p.m. Colonel Hy. T. Crook, D.L., V.D., presided.

The election was announced of the following as *Ordinary* Members : Messrs. J. R. M. Albrecht, Mendel Albrecht, Mrs. Cundiff, Miss Ethel Sandiford, Miss Eunice Swallow.

The Rev. Alexander Taylor, M.A., addressed the members on "The Land of Pardons: Brittany and the Bretons."

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The 1,144th Meeting of the Society was held on Friday, December 10th, 1920, at 3.30 p.m. The President, Mr. E. W. Mellor, F.R.G.S., F.R.P.S., was in the Chair.

The Rev. J. H. Burkitt lectured on "A Pilgrimage to Famous English Places."

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The 1,145th Meeting of the Society was held on Tuesday, December 14th, 1920, at 7.30 p.m. Mr. J. E. Balmer presided.

Mr. Charles Sutton, F.A.I., gave an address on "Manchester to Fort William and back by Road. A Scotch Motor Tour."

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The Annual Children's Meeting was held on Tuesday, December 21st, 1920, at 6.0 p.m. Mr. T. W. F. Parkinson, M.Sc., F.G.S., presided.

Mr. Henry Crowther, F.R.H.S. (Curator, Leeds Museum), delivered a lecture on "The Magic Carpet, or Peeps into Some Foreign and Home-Lands."

# List of Maps, Books, Journals, etc.,

ACQUIRED BY THE SOCIETY
FROM JANUARY 1st TO DECEMBER 31st, 1920

## Maps.

### EUROPE.

Catalogue of Maps published by the Geographical Section, General Staff. Index Maps. London: 1920. (Price 6d.) *The Director of Military Intelligence.

Beretning om Norges Geografiske Opmaalings Virksomket i tidsrummet, 1 Juli 1918—30 Juni 1919. Kristiania: 1920. *Norges Geografiske Opmaaling.

Norway. Topografisk Kart over Kongeriget Norge. Malestokk 1/100,000. A 35, Slaatteroy; E 33 Tunhovd; F 33, Flaa; F 34, Kröderen; F 35, Eiker; M 7, Bjarköy, M 10, Tysfjord; 14 A, Kongsberg; 37 B Atnasjö. Kristiania: Norges Geografiske Opmaaling, 1915—1920. *Norges Geografiske Opmaaling.

### AFRICA.

Gold Coast 1/125,000. Sheets 72. I. IV, Dadiaso; 72. J. III, Asafo, 72. J. IV, Wiawoso; 72. K. III, Obuasio (Oboase); 72. K. IV. Fumso; 72. L. I. Abetife; 72. L. III, Kibbi (Kyebi); 72. L. IV, Komfrodua; 72. P. I, Enchi; 72. P. II, Asankrangwa; 72. P. IV, Prestea; 72. Q. I, Dunkwa; 72. Q. II, Prahsu (Praso); 72. Q. III, Tarquah; 72. Q. IV, Cape Coast; 72. R. I, Nsabe; 72. R. II, Accra; 72. R. III and IV, Winnebah and Nianyano; 72. V. II, Axim; 72. W. I, Seecondee; 73. G. I, Wope; 73. G. III, Akuse; 73. M. I, Prampram; 73. M. II and 73. N. I, Addah; and Index Map. Surveyed and published under the direction of the Director of Surveys, Gold Coast. Edinburgh: W. and A. K. Johnston, Ltd., 1907 and 1908. (Price 5/- per Sheet.) *Messrs. W. and A. K. Johnston.

### AMERICA.

International Map of the World. Scale, 1/1,000,000. North America. South, J 10, San Francisco Bay. Washington: U.S. Geological Survey, 1914. *The Director of the Survey.

United States. Index Map showing progress in Topographic and Geologic Surveying and in publishing Topographic Maps and Geologic Folios to May, 1917. 2 sheets. Scale, 1/2,500,000. Washington: U.S. Geological Survey. *The Director of the Survey.

United States. Relief Map. Scale, 1/7,000,000. Washington: U.S. Geological Survey, 1911. *The Director of the Survey.

State of Iowa. Scale, 1/500,000. Washington: U.S. Geological Survey, 1916. *The Director of the Survey.

United States. Topographic Map. Scale, 1/9,600. Leadville Mining District Lake County, Colorado. Washington : U.S. Geological Survey, 1913. *The Director of the Survey.

Topographic Map of the Niagara Gorge. Surveyed in co-operation U.S. Geological Survey. Geological Survey of Canada. Scale, 7/12,000. Washington : U.S. Geological Survey, 1913. *The Director of the Survey.

United States. Topographic Map. Scale, 1/21,120. Charleston, South Carolina. Washington : U.S. Geological Survey, 1919. *The Director of the Survey.

United States. Topographic Map. Scale, 1/31,680. Six sheets. Lathrop, San Joaquin County, California (1915); Yuba City, California (1911); Electra, Texas (1918); Howth, Texas (1913); Deepwater, Harris County, Texas (1919); Mound, Madison Parish, Louisiana (1910). Washington : United States Geological Survey, 1910—1919. *The Director of the Survey.

United States. Topographic Map. Scale, 1/62,500. Twenty-eight sheets. York, Maine–New Hampshire (1920); Mt. Pawtuckaway, New Hampshire (1919); Hammond, New York (1912); McCalls Ferry, Pennsylvania (1918); Otway, Ohio (1917); Antietam, Maryland–Virginia–West Virginia (1913); Kilmarnock, Virginia (1917); Cape Henry, Virginia (1919); Wademelaw Island, Charleston County, South Carolina (1919); Peeples, South Carolina–Georgia (1920); Fernandina, Florida–Georgia (1919); Folkston, Georgia–Florida (1918); Jacksonville, Duval, County Florida (1918); Vicksburg, Mississippi–Louisiana (1920); Dove Mountain, Terrell County Texas (1918); Canutillo, New Mexico–Texas (1919); Antelope Wells, Grant County, New Mexico (1919); Phœnix, Arizona (1914); King City, Monterey County, California (1919); San Francisco, California (1915); Hillsboro, Oregon–Washington (1918); Moses Lake, Grant County, Washington (1912); Fairfield, Utah (1917); Pillager, Minnesota (1919); Deerwood, Minnesota (1914); Dixon, Illinois (1918); Saginaw, Michigan (1919); Galesburg, Michigan (1918); also Sheet showing Lettering and Conventional Signs. Washington : United States Geological Survey, 1912—1920. *The Director of the Survey.

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# List of Members.

DECEMBER 31, 1920.

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LHolt, Arthur
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# Rules.

## I. OBJECT AND WORK.

The object of the Manchester Geographical Society is to promote the study of all branches of Geographical Science, especially in its relations to commerce and civilisation.

The work of the Society shall be :—

1. To further in every way the pursuit of the science; as, by the study of official and scientific documents, by communications with learned, industrial and commercial societies, by correspondence with consuls, men of science, explorers, missionaries, and travellers, and by the encouragement of the teaching of geography in schools and colleges.

2. To hold meetings at which papers shall be read, or lectures delivered by members or others.

3. To examine the possibility of opening new markets to commerce and to collect information as to the number, character, needs, natural products and resources of such populations as have not yet been brought into relation with British commerce and industry.

4. To promote and encourage, in such way as may be found expedient, either alone or in conjunction with other Societies, the exploration of the less known regions of the earth.

5. To inquire into all questions relating to British and Foreign colonisation and emigration.

6. To publish a Journal of the proceedings of the Society, with a summary of geographical information.

7. To form a collection of maps, charts, geographical works of reference, and specimens of raw materials and commercial products.

8. The Society shall not enter into any financial transactions beyond those necessarily attached to its declared object, and shall not make any dividend, gift, division, or bonus in money unto or between any of its members.

## II. ORGANISATION.

9. The Society shall consist of ordinary, associate, corresponding, and honorary members.

10. A Council shall be chosen annually from the ordinary members to conduct the affairs of the Society. It shall consist of a President, four or more Vice-Presidents, a Treasurer, two or more Honorary Secretaries (including a Secretary for Foreign Correspondence) and twenty-one Councillors. *The President shall not be eligible for re-election after having occupied such office for three years consecutively but upon retiring from office shall be styled "Past President" and shall be an ex-officio member of the Council so long as he remains a member of the Society.*

11. There shall be three Trustees elected by the Society, who shall hold office until death, disability, insolvency, or resignation. They shall be members of the Council by virtue of their office.

12. Any vacancy occurring in the Council during the current year may be filled up by the Council.

## III. ELECTION OF MEMBERS.

13. Every candidate for admission into the Society as an ordinary or an associate member must be proposed by a member. The proposal shall be read out at the next Ordinary Meeting of the members, and any objection shall be forwarded in writing to the Secretary within seven days.

14. The election of members is entrusted to the Council. The names of those elected shall be announced from the chair at the next Ordinary Meeting after the election.

15. The Secretary shall within three days forward to every newly-elected member notice of his election, a copy of the Rules of the Society, and a card announcing the days on which the Ordinary Meetings will be held during the session. But the election of an ordinary or associate member shall not be complete, nor shall he be permitted to enjoy the privileges of a member, until he shall have paid his first year's subscription. Unless such payment be made within three calendar months frcom the date of election the election shall be void.

16. The Council shall have power to elect honorary and corresponding members.

17. Women shall be eligible as members and officers of the Society.

## IV. PAYMENTS.

18. An ordinary member shall pay an annual subscription of *£1 10s. 0d.* or he may compound by one payment of *£15 0s. 0d.* An associate member shall pay an annual subscription of *£0 15s. 0d. Students under the age of twenty-one years may be admitted to the meetings and accorded the use of the Library, Map Room, etc., at an annual fee of £0 10s. 6d.* The Society's year shall begin on the first day of January.

19. Members shall not be entitled to vote or to enjoy any other privilege of the Society so long as their payment shall continue in arrear, but associate members shall not vote nor shall they take any part in the government of the Society.

20. The first annual payment of a member elected in November or December shall cover his subscription to the 31st December in the year following.

21. On the first day of January in each year there shall be put up in the rooms of the Society a complete list of the members with the amount of their subscription due, and as the amounts are paid the fact shall be marked on the list.

22. Notice shall be sent to every member whose subscription shall not have been paid by the first of February, and if the arrears are not discharged by the first of July the Council may remove the member from the list of members. Any member, whose subscription is in arrear for two years shall not be entitled to receive the Journal of the Society.

## V. MEETINGS.

23. The meetings of the Society shall be of three kinds—Ordinary, Annual, and Special.

24. In all meetings a majority of those present shall decide all questions, the President or Chairman having a casting vote in addition to his own.

### Ordinary Meetings

25. The Ordinary Meetings of the Society shall be held once a month, from the month of October to the month of May, or oftener, if judged expedient by the Council.

26. All members whose subscriptions are not in arrear shall have a right to be present. All ordinary members shall have the privilege of introducing one visitor.

27. The order of the proceedings shall be as follows :—

(a) The minutes of the last meeting to be read and if correctly recorded they shall be signed by the Chairman.
(b) Presents, whether of money, books, maps, charts, instruments or specimens made to the Society to be announced.
(c) The election of new members to be declared and the names of candidates to be read.
(d) Papers and communications to be read and discussed.

28. At these meetings nothing relating to the rules or management shall be brought forward, but the minute book of the Council shall be on the table at each meeting for the inspection of any member, and extracts therefrom may, with the consent of the chairman, be read to the meeting on the requisition of any member.

29. On occasions of exceptional interest the Council may make provision for a larger admission of visitors.

### Annual Meetings.

30. The Annual Meeting of the members shall be held at such time and place as the Council may determine.

31. Fourteen days' notice of such meeting shall be sent to every member within the United Kingdom who has given his address to the Secretary, and notice of the meeting shall be advertised in such newspapers as the Council may direct.

32. The object of this meeting shall be to receive the Annual Report of the Council and the Treasurer's Balance Sheet, to hear the President's address, to elect the Council and officers for the ensuing year, and to transact any other business.

33. Any two ordinary members may nominate candidates for the Council or for office not later than one week prior to the day of election, and the names of candidates so nominated shall be at once put up in the rooms of the Society. The election of the Council and officers shall be by ballot.

### Special General Meetings.

34. The Council may call a Special General Meeting of the Society whenever they shall consider it necessary, and they shall do so if required by 20 ordinary members.

35. A week's notice of the time and object of every Special Meeting shall be sent to all members. No other business shall be entertained than that of which notice has been thus given.

36. Twenty ordinary members shall form a quorum.

## VI. COUNCIL AND OFFICERS.

### The Council.

37. The government of the Society shall be entrusted to the Council, subject to the rules of the Society.

38. The Council shall annually elect a Chairman and Vice-Chairman. *The Chairman of the Council shall not be eligible for re-election after having occupied such office for three years consecutively.*

39. The President or the Chairman, or any three members of the Council, may at any time call a meeting thereof, to which every member of the Council shall be summoned.

40. Seven shall form a quorum.

41. In order to secure the most efficient study and treatment of the various subjects which constitute the chief work of the Society, the Council may appoint Committees for special purposes. These Committees, with the approbation of the Council, may associate with themselves any persons—whether members of the Society or not—from whom they may desire to obtain special assistance or information. The Committee shall report to the Council the results of their proceedings.

42. The President, Chairman, Vice-Chairman of the Council, and the Honorary Secretaries, shall, by virtue of their offices, be members of all Committees appointed by the Council.

### President and Vice-Presidents.

43. The President is, by virtue of his office, the chairman of all the meetings of the Society. In the absence of the President, one of the Vice-Presidents may preside.

### Chairman of the Council.

44. It is the duty of the Chairman of the Council to see that the rules are properly observed, to call for reports and accounts from Committees and officers, and to summon, when necessary, special meetings of the Council and of Committees.

### Treasurer.

45. The Treasurer has the charge of all accounts; he shall pay all accounts due by the Society after they have been examined and approved by the Council.

46. He shall see that all moneys due to the Society are collected, and shall have power, with the approval of the Council, to appoint a collector. All moneys received shall be immediately paid to the bankers of the Society.

47. The bank passbook and the book of accounts shall be laid upon the table at every ordinary meeting of the Council.

48. The accounts shall be audited annually by *a professional accountant or* two members who shall be elected at the Annual Meeting or at an ordinary meeting at least one month before the Annual Meeting.

### Secretaries.

49. The duty of the Honorary Secretaries shall be :—

- (a) To conduct the correspondence of the Society and of the Council.
- (b) To attend the meetings of the members and of the Council, and minute their proceedings.
- (c) At the ordinary meetings, to announce gifts presented to the Society since their last meeting; to read the names of all new members and of candidates for admission, and the papers communicated to the Society, which have been directed by the Council to be read.
- (d) To have immediate superintendence of all persons employed, to make arrangements for the meetings of the Society, and to take charge of all maps, books, furniture and other effects.

50. It shall be the more especial duty of one of the Honorary Secretaries to conduct, as may be directed by the Council, correspondence with Foreign Societies, and with persons resident abroad.

51. In addition to the Honorary Secretaries, there shall be a paid Secretary appointed by the Council, whose duties shall be to assist the Honorary Secretaries, to issue the notices of the Council and of the Society, and to act under the instructions of the Council.

52. *No alteration shall be made in these rules except at the Annual Meeting of the Society, or at a Special Meeting called for that purpose by fourteen days' notice, specifying the proposed change, and agreed to, in either case, by three-fourths of the members present.*

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The foregoing rules, as now amended, were approved and adopted at a meeting of the members of the Society, of which due notice had been given to the members, held in the Town Hall, Manchester, Wednesday, October 3rd, 1894. (Signed) GEORGE, President.

S. ALFRED STEINTHAL, Chairman.
F. ZIMMERN, Honorary Secretary.
JAS. D. WILDE, M.A., Honorary Secretary.
ELI SOWERBUTTS, Secretary.

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[Copy.]

It is hereby certified that this Society is entitled to the benefit of the Act 6 and 7 Vict., Cap. 36, intituled "An Act to exempt from County, Borough, Parochial, and other Local Rates, Lands and Buildings occupied by Scientific or Literary Societies."

Seal of Registry of
Friendly Societies.

This 15th day of January, 1895. E. W. B.

Note: The amendments in italics were approved and adopted at the Annual Meeting held on Friday, May 7th, 1920.

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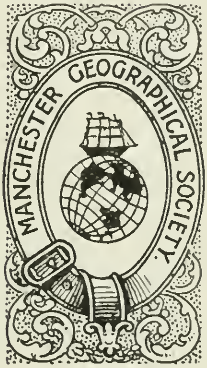
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E. W. MELLOR, J.P., F.R.G.S., F.R.P.S.,
President, 1920-1, 1921-2, and 1922-3.

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* * *

# THE GROWTH OF THE BRITISH EMPIRE.

By Arnold Williams, A.C.A.

(Addressed to the Society on December 4th, 1917.)

It is only in recent years that the English people have taken any considerable interest in those territories which together form what we term, somewhat erroneously, the British Empire. Their gradual acquisition by England, their immense distance from the homeland, the vicissitudes of our colonial policy and fortunes over a period of more than a couple of centuries, have contributed to cause us to regard our overseas' fellow-citizens as distant relatives who have "set up house for themselves" and with whom we have no further concern.

The immense significance, not only to this country but to the world, of the development of the Empire, has been missed by all but a few scholars, the general public being absorbed in the domestic problems which each year increase in number and complexity. But this significance has not been overlooked by foreign observers who have not failed to note the rapid extension of late years and its widespread nature. We cannot disguise the fact that the extent of our possessions has for long been the source of envy and jealousy on the part of foreign nations less fortunately situated in this respect.

If we have merited, in the past, the reproach of ignoring or underestimating our colonial heritage, the war has compelled us to reconsider our relations with the Colonies and Dependencies. The spontaneous association of the various branches of the Empire with the Motherland in the recent struggle, their enormous sacrifices of men and money, their voluntary identification of their own interests and fortunes with ours, these mark a further and very important stage in the development of the British Commonwealth and suggest the direction in which further progress lies. That the day is long past when England will attempt to interfere with the internal affairs of the Dominions or to dictate to them as to their relations with the remaining members of the Empire, or with other countries, we may surely take for granted. The time has come, however, when this country must seek their views on matters relating to the welfare of the Empire as a whole; and the ideal of a federation of nations may be realised, in an imperfect way, of course, in the Commonwealth of the British Nations. Before this can be satisfactorily accomplished, however, very difficult questions as to the government of such Dependencies as India and Egypt will have to be solved, and Ireland will have to be permitted to take her place as an equal with the other self-governing Colonies. But, taken as a whole, the Empire may be regarded as a practical and very valuable example of what the League of Nations might become in the future if its members were animated by good-will rather than self-interest.

It is customary, in reflecting with pride on our world-wide Empire, to conclude that it is largely due to the natural proclivity of the English people for adventure and travel; and we plume ourselves somewhat at the expense of other peoples, on the rugged character of our ancestors, and we imagine that the sea was their natural element. This view is not altogether supported by facts. There is no evidence to show that the English were a seafaring people to a greater extent than other peoples. Many of the great overseas discoveries, at any rate the earlier ones, were made by foreigners. As a matter of fact the people of this country were mainly agricultural, and lived a quiet country life until the discovery of America. Living on an island, and therefore having a much more extended sea-front than most of the European countries, it was natural that many of the people should engage in fishing. But the general population did not more naturally take to the sea, or show a greater aptitude for the kind of adventure or travel which is involved in sea-voyaging, than the peoples of other countries. There is no doubt, of course, that the discovery of America, by stimulating sea-adventure and opening up new districts for fishing did develop the character, naturally enterprising and adventurous, of the British people.

Further, it is not sufficiently realised how recent, comparatively speaking, is the growth of the commercial and industrial supremacy of Great Britain. In fact, our present position has been attained in little more than two centuries, most headway being made in the seventeenth and eighteenth centuries. In the fourteenth century the whole of the external, and much of the internal. trade of the country had been in the hands of foreigners; in the fifteenth century British merchants began to push their way from point to point in the Mediterranean and the Baltic; in the sixteenth they followed slowly in the wake of other adventurers and tried to establish themselves in unkindly regions which had attracted no one else. When Elizabeth ascended the throne, England appears to have been behind other nations of Western Europe in the very industrial arts and commercial enterprise on which her present reputation is chiefly based.*

We are, then, to consider how the English people came to possess the vast territories which together form what we call the British Empire. We are to recount the story of the growth of the Empire from the time when a few English sailors made voyages of discovery in the sixteenth century to the present time when the land area of the Empire covers nearly a quarter of the land area of the globe.

### 1. Territorial Expansion.

The expansion of England beyond the seas commenced after the discovery of America. The voyages of Columbus and Vasco de Gama, in the reign of Henry VII, in a very literal sense, changed the face of the earth. The discovery of land beyond the Atlantic by Columbus in 1492 and by Cabot in 1497 particularly effected a revolution in men's thoughts and actions, and it may be truly said that the discovery of the western continent was probably of greater importance than any other single event in history. It was not, however, the English who took immediate advantage of these discoveries to extend their domains on to the new continent which had been opened up. Spain was the first country to expand westwards (in 1521 and afterwards), and she founded a magnificent empire which has left its mark on the lands she seized, a mark still plainly visible in Central and South America.

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* Cunningham. "Growth of English Industry and Commerce."

Spain, in her relations with the colonies she established in America and the West Indies, exhibits on a grand scale the evils of what is called "the Old Colonial System." The Spanish Government regarded colonies merely as a source from which to enrich its treasury and to augment its political power. Colonists were discouraged from settling in the New World. They were strictly forbidden to engage in any industry which might threaten to compete with a Spanish industry; they were tied down to residence in some particular province; they were prevented from developing the resources about them by restrictions which applied, not only to trade with the mother country, but also to inter-colonial trade. Heavy taxes were laid on trade, so that it never acquired vigour.

Portugal, insignificant though it is in size compared with other countries, built up in the sixteenth century a commercial empire worthy to rank with that of Spain and exceeding in importance any which the more northern states in Europe had yet established. But she could not maintain this position for long.

The Dutch also made settlements on the American coasts and among the West Indian islands, and they established a West Indian Company to link these settlements together. But in 1674, after a long struggle, they were finally ceded to the English Crown.

The English did not allow the Spaniards much peace with their American possessions; Hawkins' and Drake's various excursions into the Spanish Settlements showed that the English could, if their minds were put to it, hold their own with the sailors of any country. It was, indeed, inevitable that the English should come into conflict with the Spaniards. Spain was the most powerful country in Europe, and the power of Spain seemed to block the way to English enterprise. Spain had the monopoly at that time of the riches of the East and of the West, and if England was to break through that monopoly resort to force was unavoidable. Elizabeth entered into an offensive and defensive alliance with the Protestant States of Holland for the purpose of breaking the Spanish monopoly. Ultimately the struggle was successful, but by that time the English and the Dutch had begun to quarrel with one another.

The explanation of the constant attempts during this period to find a north-west passage to India is that the Spanish and Portuguese tried to monopolise the sea-route round the Cape, and held the eastern trade almost entirely in their own hands. The aim was to find some other route in order to avoid conflicts with these two powers.

It was not, however, until the defeat of the Spanish Armada that England turned her attention from the Continent of Europe and began to look to the New World as a field for enterprise and adventure.

The Spanish and French had fairly established themselves in America, the former in Southern and Central America, and the latter, a little later on, in the North, before the English began to settle there in any numbers. Several expeditions were made by Englishmen with a view to opening up trade. During the first half of the seventeenth century, a large number of companies for colonisation were incorporated, most of whom looked to America for the realisation of their projects. There were the Virginia Company, the Bermuda Company, the Newfoundland Company, the New England Company, the Providence Company, the Canada Company, the Massachusetts Bay Company, and the Nova Scotia Company. There was also an African Company which had some stations on the west coast of Africa.

Another method of promoting colonisation was by granting charters to private individuals. In 1606 James I issued what is generally cited as the First Virginia Charter to enable English colonists to settle down on American soil. It is worth while noticing one of the provisions of this Charter; viz., that the English colonists and their posterity " shall have and enjoy all liberties, franchises and immunities within any of our other Dominions to all intents and purposes as if they had been abiding and born within this our realm of England or any other of our said Dominions." This meant that English colonisation was to be unlike that of Spain, France and the nations of antiquity; the colonists were, in fact, to enjoy the protection of the Common Law equally with the inhabitants of England.

The Carribbee Islands were granted to a single " lord " in 1627; Maryland was granted to Lord Baltimore in 1629; the Bahamas and Carolina in 1670. Trade, in those days, was imbued with the spirit of monopoly; and all the grants, whether to companies or to private individuals, were grants for a monopoly of trade, either with a particular place or in a particular commodity.

It was part of the policy of the companies to induce settlers to go to their foreign possessions, and to keep these settlers under a kind of control; but this system led to great confusion because the government of the company, although trying to attract free settlers, nevertheless regulated everything according to the company's own profit, and practically denied the right of settlers to enjoy the fruits of their industry; hence there were frequent complaints by settlers against the monopoly of the company which deprived them of profits due to them. Indeed, the object of these institutions was not so much government as the keeping up of their monopoly and the gaining of large profits.

The Spanish did not permit the settlement of English colonists in America without protest, but they could not prevent it. The real influx of English immigrants to America, came a little later, when the Puritans, wearying of the persecution meted out to them at home, sought sanctuary in America, where they hoped they would be free to live a simple, frugal life, and worship in the manner that seemed to them most in accord with the Divine Will. As Seeley says, "The emigrants departed with a secret determination, which was to bear fruit later, not of carrying England with them, but of creating something which should not be England."

It was to the New England group of settlements that this migration of the Puritans was chiefly directed. The Non-Conformists, known as the Pilgrim Fathers, sailed from this country in the "Mayflower" in 1620, and after landing in Plymouth Bay, made a permanent occupation of the country round about. Their relations with the natives were, on the whole, friendly, and they continued to make fresh settlements, viz., in New Hampshire (1622), Massachusetts (1628), Rhode Island (1631) and Connecticut (1633). This group of northern colonies became the most powerful of all the thirteen settlements that were made on the eastern coast of America before the War of Independence. They formed themselves, in 1643, into a federation known as "The United Colonies of New England," which in later times formed the germ of what is now the United States.

There were two great forces operating on men's minds at the time of the settlement in America: (*a*) The Reformation;

(*b*) The attraction of the New World. Superficially, the Reformation would seem to be vastly the more significant, but that is because its consequences were more immediate. The consequence of the discovery of America naturally were not immediately apparent, and took a century or so to become really noticeable; but we may observe that among them were the decline of Spain as a first-class Empire to a small European country, and the transformation of England from an unimportant island off the north-west coast of Europe to one of the greatest powers in the world.

We must also observe that behind the religious upheavals of this period was the struggle for commercial supremacy on the part of the European Powers. It is a fact that all the wars after the discovery of America, however disguised as monarchical or religious, were, in reality, trade wars. It may be true, in normal times, that commerce promotes peace, and peace encourages commerce, but in that age it was certainly the fact that commerce led to war, and war promoted fresh trade. The old saying "Trade follows the Flag" has its justification in British history.

It is interesting to note that although England entered into an alliance with the Netherlands, a Protestant country, with a view to breaking the power of Spain, a Catholic country, she was presently, as we have seen, at war with the Dutch on purely commercial grounds.

It is convenient to observe here that, as early as 1688, Lewis Roberts, in his book "The Merchant's Map of Commerce," remarked that English commerce was now no longer confined to the export of the staple merchandise of the country, such as cloth, lead, tin and drapery, but that we had obtained a fairly considerable carrying trade as well, so that other nations now obtained the products of distant foreign countries through the agency of English merchants. The East Indian Company had now the traffic with India, Arabia and Persia, of which the Italian merchants had formerly the monopoly. The Levant Company now carried on nearly all the traffic with Turkish and Asiatic ports which had previously been in the hands of France.

The Dutch were still, however, the foremost carrying nation, and were the ocean-carriers of the day both to East and West. In the attempt to alter this the Navigation Acts of 1651 were passed, and subsequently renewed and enlarged in 1672. These Acts forbade the importation of goods from Asia, Africa or America in any but English vessels or ships of the country in which the goods were made. The Acts were, of course, directly aimed at the Dutch, and the latter naturally resented them. A naval war broken out between the Dutch and English (1652—54).

It is often assumed that these Acts increased our commercial prosperity and ultimately gave us the supremacy which we now possess. This may be doubted. That supremacy is due to many causes, and it is probable that our wars with the Dutch took away much of the profit that we gained from the Acts which caused the wars.

We may take it then that the expansion of England, the foundation of Greater Britain, can be dated from the time that English people settled on the other side of the Atlantic. Professor Seely classifies the series of events leading up to the expansion of England as follows :—(*a*) The Spanish Armada; (*b*) the Colonisation of Virginia and New England; (*c*) the growth of the English Navy and Trade; (*c*) Cromwell's attack on Spain; (*e*) the Naval wars with Holland; (*f*) the Maritime supremacy of England from the Peace of Utrecht, and (*g*) the Duel of England and France for the New World.

The Treaty of Utrecht (1713), terminating what was called the War of the Spanish Succession, apart from other provisions of importance, contained two which are of immense significance in the history of the growth of the Empire. Nova Scotia, Newfoundland, St. Christopher, Hudson Bay, Minorca and Gibraltar were to be handed to England, and the right of supplying slaves to the Spanish Americans was to be reserved to England.

England had now definitely gained the commercial supremacy of the world, and as a result of the right reserved to her by the Treaty to supply slaves to the Spanish Americans she became the great slave-trading country of the world. As her commerce increased her colonies developed. The nations whom she had out-distanced in trade now found her their greatest rival in colonisation. The competition grew keener and keener and the relations between the home countries grew more and more bitter. To the existing causes of quarrel was added the rivalry in the colonies. Moreover, the hostility between nations was maintained between their respective colonies, and the European wars which filled the first half of the eighteenth century had their counterpart in those regions of the world where the colonising spirit was most active. Chief among these struggles were those between the English and French in America and in India.

Although somewhat later than Spain and England in exploring the New World, as early as 1534 a Frenchman had discovered the St. Lawrence, and French settlements were made in Canada, Nova Scotia and Cape Breton. Franciscans and Jesuits attempted to convert the Red Indian tribes, and moved along the line of the great lakes, then southward, until in 1673 they reached the Mississippi. Later adventurers with more mercenary objects in view, traced the river's course down to the sea in 1682. Among these was La Salle, who explored the whole of the vast and fertile region on both banks of the Mississippi, and named it Louisiana in honour of Louis XIV. Later France held the whole coast from Hudson Bay to Maine, and large tracts of Canada as well.

The English settlers, at various points, found their further progress barred by the French. The French Government, however, was too busy with European affairs to give much heed to the fortunes of its representatives in America. The consequence was that, presently, the English colonists greatly out-numbered the French. When the final conflict came, the British, as we know, took their North American possessions from the French in 1759. These, together with other territories added at later periods, form now the Dominion of Canada. (Newfoundland, which is adjacent to Canada, is not in the Dominion, and has a Government of its own. Labrador is subject to the Government of Newfoundland.)

One of the most important events in the history of the growth of the Empire was the secession of the American Colonies. It is of importance because not only did we lose what was at that time the most vigorous offshoot of the Mother Country, and her first attempt at Empire, but because, although not at first, yet eventually, England learned the lesson of the loss and never again committed the same mistake.

Previous to the Navigation Acts there is no doubt that the colonists enjoyed considerable liberty of trade, but the effect of these Acts was such that all commercial intercourse of the colonies, both of export and import trade, had first to go through British hands. Moreover, manufactures in the colonies were discouraged. A large illicit trade with the Spanish Americans and the French West Indies sprang up. There was a growing ill-feeling between the colonists and the home country. The colonists complained that England was trying to cripple their trade and that Parliament, in which they were unrepresented, forced upon them oppressive laws and distasteful taxes. Various attempts were made by the British Government to impose taxation on the Americans, with the result that the relations between them were still further embittered. The justification of the taxation was the need of the British Government for revenue in order to meet the expenses of the Seven Years' war in which the colonists had undoubtedly received substantial help from England and had gained material benefits from the Treaty concluded. The British Government's mistake was in seeking to impose this taxation without the assent of the colonists and without allowing them representation in the British Parliament.

But, although it is recognised that the colonists had grievances against the Mother Country, recent investigation has shown that these grievances were not so great or their pressure so irksome as had been supposed. The colonists, however, had lost interest in the political affairs of England. They resented being called upon to contribute towards the expenses of the Continental struggles in which this country was engaged. Virtually, these economic grievances merely cloaked a growing antagonism to the restraint involved in connection with the Mother Country. " The Pilgrim Fathers had gone to the New World," says Professor Cunningham, " in the hope of carrying out their own views of what religious life ought to be; by joining in the Declaration of Independence, their descendants in New England seized an opportunity of claiming the right to work out their own ideals of political life apart from the conflicts and entanglements of the Old World. This was the positive aim in the minds of the leading men of the time, and any economic grievance sinks into insignificance by its side. In so far as economic causes affected them at all, it was chiefly because the extent and resources of their country rendered the colonists self-reliant. It was not from the grievances caused by economic dependence, but from the economic strength of the colonies, that the desire to sever their connection arose, and it may be doubted whether any concessions in the way of Parliamentary representation would have rendered them content to remain in a position of political dependence for all time."

Yet there were compensations for the loss of the American Colonies. As the new nation prospered our trade with it increased; and as American agriculture and industries developed, the demand for our manufactures in their market also became greater. From the commercial point of view, the secession of the colonies did our trade very little harm, for shortly afterwards we notice a considerable increase in the imports and exports to and from the colonies.

The history of British rule in India begins with the Charter granted by Elizabeth in 1602 to the "Governors and Company of the merchants of the City of London trading to the East Indies." Under this Charter the company might carry on trade, acquire territory by treaty or conquest and raise troops for the defence of their possessions. For a long time the company had merely a number of trading stations in various isolated districts. It had no territorial influence.

The Portuguese had been the first to found settlements in India, and they were quickly followed by the Dutch.

The French had formed an East India Company as early as 1604, and other companies followed at various intervals.

The Portuguese and the Dutch were not long a serious menace to the English in India, but the French were very formidable rivals. The French Company was under close government supervision. A new French Governor, Dupleix, was sent out in 1741, and he quickly let it be known that he had political, rather than merely commercial, objects in view.

Hostilities between the French and the English were almost continuous until French power in India was destroyed. In the long struggle Robert Clive was the man who pre-eminently distinguished himself, and he was acclaimed by the English as a national hero. He effected many reforms in the administration of India and the service of the Company. He had gained many enemies as a consequence of his actions in India, and efforts were made to discredit him. An attempt to pass a vote of censure on him in the House of Commons, after a stormy debate, ended in his acquittal, and the Commons passed a unanimous resolution "that Robert Clive did render great and meritorious services to his country."

We must attribute to Clive the establishment of British rule in India upon a firm footing. The work of his successors was to develop and expand what he had begun.

Many sailors had sought for the great southern continent which they thought to exist somewhere in the south seas, and had discovered various groups of islands in the Pacific. Others actually skirted the Australian Coast. Tasmania was discovered in 1642, and New Zealand in the same year. William Dampier, an Englishman, set foot on Australian shores in 1688, and in a second voyage coasted Western Australia for nearly 1,000 miles, but there was no tangible result from these discoveries.

In 1768 Captain Cook made his first voyage to Australia. He explored Botany Bay and the neighbourhood, which he visited in 1770, and named it New South Wales. (It is of interest to note that the name Botany Bay was given to the place first visited by Cook in Australia on account of the variety of plants found there.)

It had long been the practice to send political prisoners and criminals overseas. England had been sending them to America, but these colonies were now closed to them. Some other place had to be found, and the opening up of Australia suggested that land as a suitable place. The first batch was despatched in January 1788 to Port Jackson—now Sydney.

Australia came to us, it will be seen, just about the time that we were losing America.

South Africa had been first discovered by the Portuguese in 1486. After passing into the hands of the Dutch, and being occupied by them for some 140 years, in 1814 it passed formally into the possession of the British, adding a further wider extent of territory to the rapidly enlarging domains of this country.

Most of the territories which together form the Straits Settlements were acquired before the end of the first quarter of the nineteenth century. The whole of them passed under one government in 1867.

Trouble had been brewing for a long time in Canada. The French population in Quebec strongly resented the British rule, and grave fears for the future were entertained. Lord Durham was sent out to investigate and report on the state of affairs, and in 1839 he sent in his famous Report containing his recommendations for reform. This report may be said to be the source from which the self-governing Dominions derived their freedom.

We must summarize the subsequent additions to the Empire. In 1839 New Zealand was first permanently colonised and included in the Colony of New South Wales. In 1844, after fighting with the Boers, Natal was declared a British Colony. In 1855-6 New Zealand became a self-governing Colony. In 1855 the Government of India was vested in the Crown. Burmah was annexed in 1886.

The importance of Egypt to England lies in the fact that the Suez Canal, which forms part of our ocean highway to India, runs through Egypt. It is absolutely essential to this country that the Suez Canal should be kept open for traffic both of a commercial and military character. England, in 1875, bought from the Khedive his 400,000 shares in the Canal for £4,000,000, and thus became the largest shareholder. In 1879, Egypt, having become practically bankrupt, was handed over to the dual control of England and France, the Khedive being only a nominal ruler. France had ceased to exercise her share of the control, and England has been practically predominant since 1882.

## Economic Expansion.

So far I have merely narrated the bare facts of the acquisition of the various parts of the Empire. It is now necessary to consider, more particularly, those economic causes which underlay the movements described. The territorial expansion and the economic expansion, of course, acted and reacted on one another; they are here separated merely for convenience of treatment.

We have seen that most of the wars in which England has engaged since the discovery of America, even where the cause has been ostensibly religious, were commercial wars. The nations of Europe were involved in a desperate struggle for supremacy in trade, although the mass of the population may not have realised it—nor in every case did their statesmen—and were disposed to ascribe the various conflicts in which the long struggle resulted to religious differences or dynastic quarrels.

The commercial policy of this country in the early years of its colonial expansion—as was also the policy of other countries—was what has been called "Mercantilism." There has been considerable misconception, both as to the policy and the effect of Mercantilism. It has been associated with State regulation of industry and trade, and therefore the early advocates of Mercantilism have been supposed to have been averse to freedom of trade and to favour a highly protectionist policy. But, as Dr. Marshall has pointed out, the regulations and restrictions of trade which are found in their systems belonged to the age, and were not the peculiar devices which they advocated. As a matter of fact, the changes which the mercantilists endeavoured to bring about were in the direction of freedom of enterprise.

Nevertheless, the actual policy tended to increase rather than relax the regulations and restrictions that impeded the natural movement of trade. The policy of the period was based on the desire to promote the national strength. The individual, either trader or consumer, was not considered if his interest was thought to be opposed to what was conceived to be the national welfare. The aim was to have a strong nation, and this was only to be achieved by increasing the security of the country, which was, in its turn, dependent on a powerful navy, the possession of a large supply of money, and a large and vigorous population.

We must notice the view which was entertained in those days of the place of money in the national economy. If an individual had plenty of ready money he was considered to be " well off." If he had little, he was thought to be " poor." The same reasoning was applied to nations. If a country had a good stock of gold and silver she was in a much better position when war threatened than a country which had a smaller stock. It was, therefore, the policy of all countries to accumulate the precious metals. The discovery of silver in the New World, and the knowledge that Spain was piling up an immense money treasure, greatly excited other countries, and were largely the operative motives for those piratical adventures of some of England's greatest seamen of that time.

This view of the necessity of storing up a large supply of money or treasure in a country affected the trade policy in respect of export trade. It was held that it was bad for a country to import manufactured goods, because, in the first place, these goods would compete with home manufactured goods and so adversely affect home industries, and, further, they would have to be paid for in money, and this would deplete the supply of money held by the country. But this reasoning also affected their view of exports. Exports were valuable because they encouraged home industries, and also because they brought money to the country, imports being discouraged, and exports, therefore, being paid for in money. The whole policy can be classified under four heads: (1) goods must be carried in English ships so as to stimulate ship-building; (2) agriculture must be encouraged so as to render the country self-supporting; (3) home manufactures must be encouraged so as to provide work, and this must be done by prohibiting the importation of competitive foreign goods; and (4) gold must be accumulated, and therefore exports must be encouraged and imports discouraged.

A long series of Navigation Acts sought to achieve the objects aimed at in this policy. Not only was the encouragement of trade and industry aimed at, but the expansion of English ship-building with a view to both naval security and the development of the carrying trade. We have already seen how the English came into conflict with the Dutch in this matter, and there is no doubt that the latter were the direct object of much of this restrictive legislation.

This mercantile policy was not conceived or formulated in a day. It formed the basis of England's commerce for several centuries, and the last vestige of its restrictions did not disappear until the nineteenth century with the repeal of the Corn Laws and the adoption of Free Trade.

With such a commercial policy it is not difficult to understand the view which nations took of their colonial possessions. These had been sought mainly with a view to the enrichment of the mother country, and the discovery of the precious metals naturally stimulated countries to further effort in colonisation, but always with a view to the benefit of the country itself and not that of the colonists. Restrictions imposed on the development of their trade and industry in pursuance of this policy, naturally did not predispose the colonists to amicable relations with the mother country, nor did they cause the colonies to become the source of strength it was hoped they would. They merely made the colonists impatient of the control exercised over their affairs. The only consolation which an Englishman can derive from a study of this period is that if England's relations with her colonies were anything but happy, and her treatment of the colonists unwise and even at times harsh, and if eventually these things led to the loss of the American Colonies, the treatment of colonies by other nations was even worse. The evil lay in the mistaken views which were entertained by even the wisest statesmen of those days of the position of colonies in relation with the mother country, and particularly in the persistence with which men held and applied a theory of trade which had outlived its usefulness.

Before, however, the Mercantile System was to be abolished immense changes in the commerce and industry of the country were preparing. The industry of this country had been conducted in a very primitive fashion. Manufactures were carried on under what has been called "The Domestic System," *i.e.*, in people's own homes, where the father and mother were aided by their children and apprentices. Agriculture, although it had received encouragement from the Government, was in a very backward state. The roads had been allowed to get into bad condition, and the means of communication were comparatively few. Nevertheless, trade progressed steadily, if fairly slowly. During the eighteenth century there was a continuous improvement in agriculture. New crops were introduced from the Continent, vast improvements in machinery were made, while the adoption of new systems of cultivation enormously increased the productiveness of the soil. Among the improvements were the introduction of winter roots, the increased employment of artificial pasture and of cultivated grasses, and the adoption of a more efficient system of rotation of crops. There were still greater improvements in sheep and cattle breeding.

To effect these improvements enclosure of common lands was necessary. The open field system encouraged poor methods of farming, and lack of capital prevented the adoption of better methods. For larger farms larger capital was required, and larger capital could not be obtained unless there was control over its use and some prospect of a proportionate return. Enclosure was therefore applied on a fairly extensive scale, but it was applied without due consideration for the welfare of the agricultural population, and the resulting distress was very great and widespread.

We now approach the commencement of the great movement which has been called "The Industrial Revolution," in consequence of the enormous changes which in the course of a comparatively short period it effected in English life and industry. The beginning of this movement may be placed somewhere between 1750 and 1770. The Domestic System of manufacture, already referred to, had created a body of artisans, working with their families and apprentices, for the manufacturer, but making the articles they were engaged in manufacturing, from start to finish, in their own homes. The material was handed to them by the manufacturer, and the completed articles returned to him. All this was altered by a remarkable series of inventions and their application to industry. The facts may be briefly classed under two heads, (*a*) Changes in the technique of production, the use of new mechanical devices and scientific processes either to attain ends which had previously been attained more expensively and clumsily, or to produce what before could not be produced at all; (*b*) Structural alterations in the economy of the country.

I have not space to do more than enumerate the inventions which were responsible for the tremendous change that came over England's industries in the second half of the eighteenth century. In 1769 James Watt took out a patent for his steam engine. but the engine was not introduced into the cotton industry until 1785, and it was not applied to the power loom until 1789. In 1770 James Hargreaves patented his "spinning-jenny." In 1771 Arkwright invented the "water-frame," which enabled men to spin cotton yarn of sufficient strength. The production of the finer yarn, and as a consequence, that of muslins, was made possible by the "mule" invented by Crompton in 1779. In 1785 Cartwright, who had been ridiculed when he suggested the feasibility, invented the "power loom" for weaving cloth. This machine was not used to any large extent until 1813. Other inventions, less striking individually, but combined with the others of great effectiveness, soon followed. Bell's invention for cylinder printing of calico goods enabled one man to do as much with the machine as one hundred had done in the old style. Heathcoat invented a machine for lace making; Murray invented machines for heckling and spinning flax, which led to the introduction of machinery in all branches of linen making. Benjamin Gott adapted the inventions first applied to cotton for use in the woollen industry. All the textile industries began to change from hand driven to machine driven processes. The result was an enormous increase in the amount of goods manufactured, and a corresponding fall in prices. In the cotton industry alone the change was so great that the trade was trebled during the years 1788—1802. In 1740 about a million and a half pounds of cotton were imported; in 1815 close on one hundred millions.

The application of steam power to machinery required coal and iron. England was rich in coal mines, but they had not been well developed because of the difficulty and expense of working them. But now there was a great demand for coal, and this led to a great development in mining. As has been remarked, before the Industrial Revolution means of communication were few and the roads bad. In 1761 the first canal was cut, under Brindley's direction, from the Duke of Bridgewater's Colliery at Worsley to Manchester. This was so successful that Brindley was in great demand. Numerous other canals followed, and rivers were connected up, and thus a complete network of communications by water was opened up all over the country. A kind of reciprocal relation existed between machinery, coal and iron. Machinery required steam power to drive it; coal was needed to produce the power. But coal, it was discovered, could be used for the smelting of iron, which in its turn could be used for making the machinery.

This vast extension of the means of communication not only enormously facilitated the transport of goods, and thus contributed towards the expansion both of industry and trade, but it greatly reduced the price of goods and contributed, therefore, in another, and not less effective way, towards the development of England's commerce.

The following table, taken from Clive Day's "History of Commerce" will give an idea of the advance of English trade in the eighteenth century:—

| Average. | Imports (In millions of £). | Exports. |
|---|---|---|
| 1698—1701 | £5.5 | £6.4 |
| 1749—1755 | 8.2 | 12.2 |
| 1784—1792 | 17.7 | 18.5 |
| 1802 | 31.4 | 41.4 |

These figures show that the foreign trade of England grew between five and sixfold in the course of the century; that it advanced considerably in the first half, but moved with the speed of a revolution in the second.

Accompanying this immense increase in trade, we must not fail to note the growth of the population. During the first half of the eighteenth century the increase was about 18%, in the latter half not far short of 50%. This increase, as we may suppose, occurred mainly in the towns of the new manufacturing districts.

One would imagine that the result of the increase in trade would be general prosperity and a fairly equitable distribution of the new wealth. This, however, was not the case. The industrial and social conditions during the period of greatest expansion were very bad. The causes are various, and it is idle to indulge in severe denunciations of the selfishness of the period. The state of agriculture, notwithstanding its gradual improvement, was not very flourishing, and, as has been pointed out, this very improvement had entailed the most serious consequences for a large section of the agricultural population. These people naturally flocked to the towns and were absorbed to a large extent in the growing industries, but their numbers helped to keep wages down. The labour that the new machine-worked factories wanted, however, was the labour of women and children, and this could be had very cheaply. It was encouraged by many men who found that it could be supplied with a small but regular income, which only needed the addition of wages of irregular periods of work by themselves. Even if new opportunities were opening to labour, by the constant erection of new factories, labour's mobility is at all times slow, and at that period, when the arts of reading and writing were generally unknown, and the cost of postage was prohibiive, the difficulties of labour in following demand can be imagined.

But if many people suffered by being thrown out of employment by the increasing use of machinery and its greater productivity, it must be remembered that those who found employment in the new factories suffered severely from the conditions under which they had to work, and the treatment of many of the employers. There are reasons to believe, however, that there is some exaggeration in the pictures that have been drawn of the sufferings of the people at this time. The employment of children for very long hours in the factories has been very generally, and very rightly of course, condemned as being detrimental to the health and welfare of the children. But it is necessary to recognise that although the conditions under which these children worked are rightly condemned from the point of view to-day, they were not worse than—it is even said that they were actually better than—the conditions under which they worked at home for their parents. It is alleged by some writers that many parents objected to their children being placed under conditions much better than those they were accustomed to at home, and better than those to which the parents themselves had been accustomed to.

When all is said, however, there can be no possible doubt that the people did suffer very severely from the fever which seemed to seize the employing classes to enrich themselves to the fullest extent while the opportunity lasted.

But there was another cause for the distress that was so general at the end of the eighteenth and the beginning of the nineteenth century. England was for more than twenty years engaged in a life and death struggle with revolutionary France, and the effect of this struggle on England's trade was very serious indeed. Some idea of the state of the people during this period may be derived from books such as Charlotte Brönte's "Shirley." But this country was not alone in this respect. All Europe had suffered from the intensity and the length of the war. The enormous cost of the war, and its adverse effect on trade, must be taken into account in estimating the effects of the introduction and development of machinery in factories. At the close of the war our National Debt stood at £880,000,000.

The effect of the war, however, was not wholly bad from the point of view of England's commerce. Her naval victories gained her undisputed mastery of the seas, with the result that she obtained an immense share of the carrying trade of the world, and this enabled her the better to withstand the dislocation caused by the war. During this period, in 1807, the Slave Trade was abolished by Act of Parliament, and in 1833 the Act for the Emancipation of Slaves was passed with £20,000,000 compensation to the owners.

I have already alluded to the difficulty of the workpeople in finding employment or changing from one job to another. When we remember that at the beginning of last century there was no general education, that prior to 1833 not a penny of public money was spent on education, and that very few people could sign their own names, much less read and write, we can to some extent appreciate the helplessness in face of the new conditions. But owing to the general upheaval caused by the French Revolution, and greatly accentuated by the war, trade was in a state of continual fluctuation, and the workpeople, when their work temporarily ceased, had nothing to fall back upon. Under the old conditions, before the rise of the new manufacturing districts, when trade was slack, the people had other tasks to resort to, and there were always the agricultural seasons when many could help with the harvesting, etc. But now they were congregated in the towns, and when work failed they were stranded. Heavy taxation, and the constantly increasing price of bread, completed a state of affairs which promised little relief for the majority of these people. Discontent, suppressed during the war, began to show itself. Disturbances occurred with increasing frequency, and machinery was destroyed.

William Cobbett, by his writings, turned the people's attention to the need for political reform, and agitations sprang up all over the country, culminating in the well-known tragic incident, "Peterloo."

So alarmed became the authorities at the state of the country that in the closing weeks of 1819 the legislation known as the "Six Acts" was hurried through Parliament. These Acts were designed to prevent military training of the people, except under order of the Lord Lieutenant of the country, to permit the search of houses for arms, and the arrest of persons carrying them, to prevent what were considered "seditious meetings" and the publication of blasphemous and seditious libels, and stamp duties were imposed on newspapers which did not exceed two sheets or which were sold at a less sum than 6d. (this was with a view to preventing the circulation of pamphlets of a political nature).

At last, in 1832, the agitation for reform was successful, and the Reform Bill was passed.

The exhaustion produced by the prolonged strain of the Napoleonic Wars, and the resulting distress, first directed men's minds to the possibilities of the colonies, and an important school arose which advocated emigration as a remedy for the ills from which England was then suffering. Malthus had inspired many people with a terrible dread of the danger of over-population, and emigration was regarded as the only practicable solution of the problem. Wakefield, who was the leader of this school, urged that a system of selling colonial lands instead of giving them away should be adopted in order that labourers could be obtained who would remain labourers for some time. It was useless to try to get workmen on the land if they could procure land for themselves for the mere asking.

Women were particularly needed in the Australian colonies, and the proceeds of the sale of the land were to be applied to the encouragement of the emigration of females. A sum of £42,000 was expended for this purpose between the years 1832 and 1836. Assistance was also given to some extent to the emigration of married artisans. Emigration Commissioners were appointed in 1831 to superintend generally matters relating to emigration.

The annual exodus to Canada after the Peace attained great proportions. The average annual emigration for some years was twenty thousand, and in one year as many as fifty thousand persons emigrated to Canada. The provision on board ship for the emigrants was extremely bad, and Government officers were appointed in the different ports for their protection, but it does not appear that very effective measures were taken. It was during this period that Lord Durham made his famous Report on Canada, and he advocated the granting to the colonies of full and responsible self-government.

The remarkable development of the Empire in the nineteenth century cannot be understood without due appreciation of the rapid expansion of the means of internal and external communication. The first Act of Parliament for the construction of a public railway was passed in 1801. The steam locomotive had not yet been invented, although steam coaches were already used on the public roads. At first, after the invention of the locomotive, the growth of railways was slow, but later it became quicker. The progress of the nineteenth century in the matter of railways may be seen in the fact that to-day we have 16,000 miles of double and single railway, and up to the years immediately preceding the late war there was no comparison between the cost of transport then and in the early years of the century.

But steam had been applied at an earlier date, and much more successfully, to water carriage. After a few experiments on short trips, the first voyage by steamer across the Atlantic was made in 1838. The development of our shipping during the nineteenth century was nothing less than phenomenal, and it is safe to say that without the greatly increased facilities of communication between England and the Colonies—as well as between the Colonies and other countries—due to the progress of English shipping, and the revolutionary effect of the invention of the electric telegraph, the expansion and the cementing of the Empire which the country witnessed would not have been possible.

The century 1815—1915 has been an age in which both State action and private enterprise have been conspicuous beyond the seas. It has been an age of large additions to the Empire, chiefly by expansion. At this point and at that there has been a widening of the circle, there has been in many cases a movement from the coast inland, and there has been the filling up of vacant places; in the main, however, the growth of the Empire during the nineteenth century can be best described by the term "expansion" which has been facilitated by railways.

Some idea of the vast extent of this expansion can be gained from a comparison of figures for 1800 and those for the present time. The Empire has increased its area nearly six times since 1801. For every 100 square miles in 1801 there are now 561. For every 100 in the population in 1801 there are now 364. In 1801 the Empire was 6½ times as large as the United Kingdom. To-day the Empire is nearly 100 times and its population 8½ times as large. The Empire is fifty-five times the size of France, fifty-four times the size of Germany, and three and a half times the size of U.S.A.

Accompanying this vast quantitative growth there has happily been a great qualitative growth. In 1800 there were no colonies in the sense that there are to-day. The whole of the Empire abroad was under the direct rule of the Crown. Not one of them was self-governed, as many of them are to-day. They were then British Possessions; to-day they are members of the Empire, having equal rights and mutually dependent interests. It is this qualitative growth that has rendered possible the quantitative growth.

Staticians calculate that the British Empire is the wealthiest aggregate of communities in existence. The only Power which rivals it in economic force is the United States, and the united wealth of the two Anglo-Saxon Powers probably exceeds the total wealth of the rest of the world.

At Queen Victoria's accession India was the most important part of the Empire beyond the seas, being about three times as wealthy as all the then colonies together. The balance is now reversed. The total wealth of the Colonies exceeds that of India; the aggregate wealth of Canada, Australia and South Africa probably equals that of India, and is three times that of the rest of the Colonies. The first place belongs to Canada, for part of Canada was flourishing when New South Wales and Cape Colony were in their infancy. Its established position as a field for colonial enterprise, and its proximity to Europe and the United States compensated, to some extent, for the superior attraction exercised over capital and emigration sixty years ago by the gold fields and the boundless capacity for wool production of Australasia; and since the construction of the Inter-colonial and Canadian Pacific Railways, and the opening of the North-west territory to settlement, the primacy of the Dominion has been confirmed. Australasia takes the second place, and South Africa the third, in economic importance among the self-governing Dominions.

. It is to be noted that the great self-governing Dominions are mostly situate in the temperate zones. The Crown Colonies are for the most part in the tropics. These two facts have had, and will yet have, a profound influence on the destiny of the Empire.

England must identify herself absolutely with the Empire as the one road to national salvation. Science is weakening the position of England as an island kingdom, but it is greatly strengthening the Empire position as an Empire.

We have noted the importance to an imperial power of the telegraph. The powers of steam are growing, aviation is only in its infancy, and these things are bringing the different parts of the Empire closer together. The lands and peoples are becoming less distant. The miles are there, but they are not the miles that they once were.

If the end of England came to-night, and this island were covered by the sea, which has ever been its great friend, the work would remain behind, and the world would be a better world for the fact that Englishmen had lived and wrought in it, and also because they had left their posterity beyond the ocean to carry on their working capacity and sense of fair play. But the island is not yet submerged. It stands four square still, the original home of the race, the corner stone of the Empire.

## Review.

"Hampshire." By TELFORD VARLEY. Maps, diagrams and illustrations. Cambridge County Geographies. Cambridge University Press, 1922. 3/6 net.

This little book reproduces all the excellent features now made so familiar by its predecessors of the same series. We note the compact arrangement of its varied contents, the exhaustive and scientific treatment of every aspect of the subject matter, the pictures, maps and diagrams, the gazeteer of the chief towns and villages and the section dealing with the famous men and women who have shed lustre on the county by their association with it. No part of England has played more continuously such an important rôle in the national history and no part is richer in eloquent memorials of the past. While its home industry is almost entirely concerned with agriculture its ancient port of Southampton still serves in point of time as a connecting link between the days of the earliest Jutish and Saxon settlers and the world of to-day, and the numerous shipping companies which use it as a port of call connect it in point of space with the great centres everywhere of trade and commerce.

M. G. H.

# CZECHO-SLOVAKIA.

By Hugh H. Bowden.

(Addressed to the Society on March 8th, 1921.)

When your Chairman heard that I was going out to Czecho-Slovakia in October last he asked me if I would address you upon that country on my return, and I consented to do so, not quite realising that any address before your Society would necessarily be purely geographical. Mr. Clarke has since assured me that the word " geographical " covers a very large number of subjects, and it is with the hope that you will agree with him that I venture to appear before you to-night.

I am very anxious to avoid, as far as possible, international politics, but should I transgress I wish to ask your indulgence, because that part of Czecho-Slovakia, viz., Bohemia, is a country I have been in close touch with for the last twenty years, and its future is of very considerable interest to me, and should, in my opinion, interest the commercial community of this country to a much greater extent than it has done in the past. My principal difficulty in framing a lecture on Czecho-Slovakia is to find a starting point, because the history of the Republic, as we know it to-day, is so bound up with that of Austria-Hungary, and, indeed, with that of the old Holy Roman Empire. I will, therefore, begin by making a few remarks on the Romano-Germanic Empire or, as it was later called the "Holy Roman Empire" merely to trace its connection with those countries which now form part of the Czecho-Slovakia Republic.

The Romano-Germanic Empire was founded in the year 800 A.D. by the Emperor Charlemagne, and he was crowned at Rome on Xmas Day in that year. Although he founded a line of kings who ruled in Paris, he himself was of Teutonic origin, coming from Austrasia. He eventually ruled over the whole of modern France, part of Germany, the northern part of Italy, and part of Spain. The centre of his Empire was the Rhine, and his favourite residence at Aachen (Aix). After the signing of the Treaty of Verdun (843 A.D.), the western part of the empire, containing a Gaulo-Romanic people, split off

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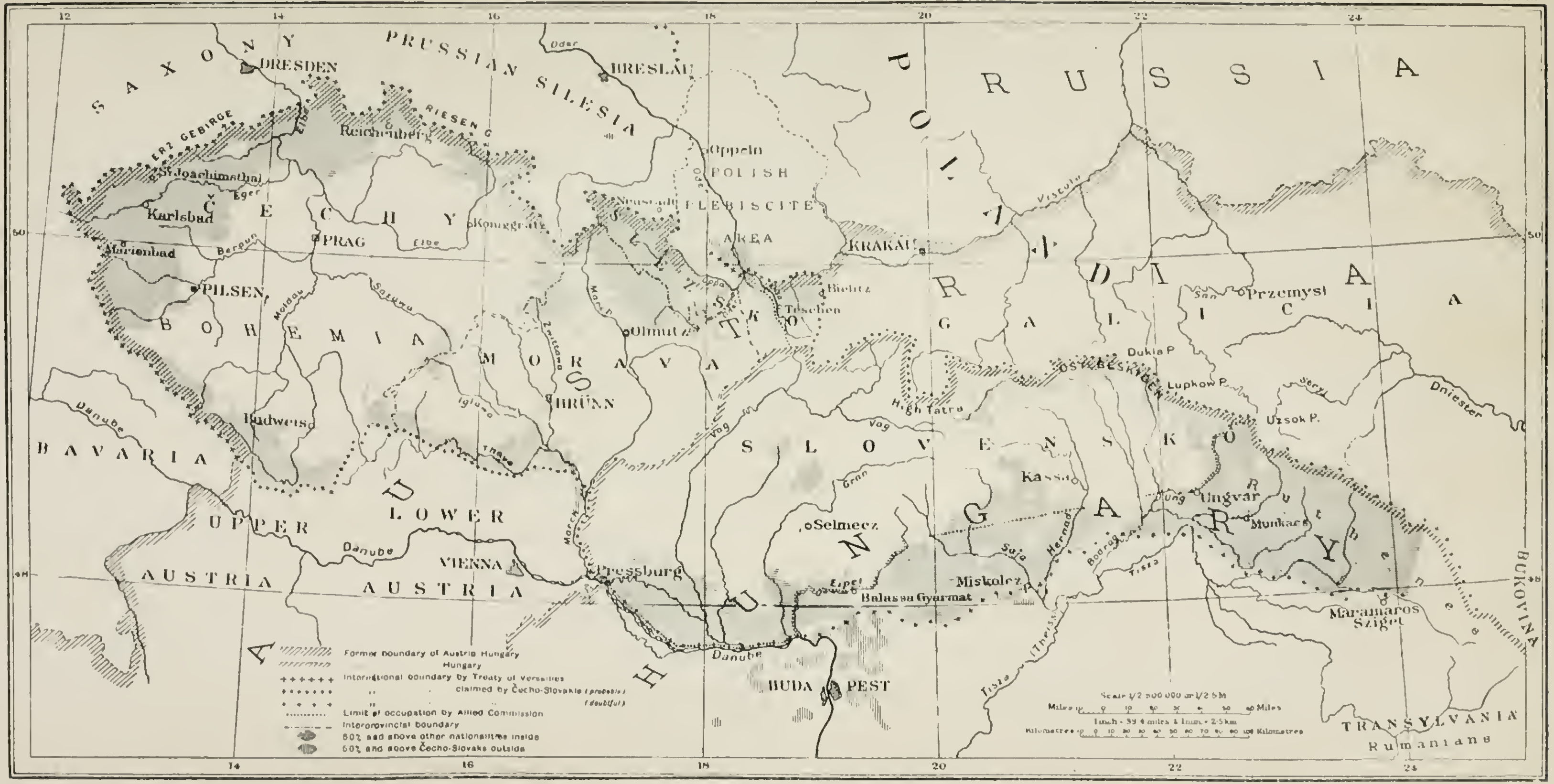

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from the German part and re-formed itself into modern France. The imperial title followed the Teutonic half of the Empire, and this half gradually expanded eastward at the expense of the Slavs.

Bohemia appears to have come within the Empire early in the ninth century.

Moravia joined the Empire by its incorporation with Bohemia in the eleventh century.

Silesia, by the partition of Polish Crown territories, came within the confines of the Empire in 1138, and from 1331 to 1742 was almost continuously a province of Bohemia.

Slovakia, which formed part of Moravia up to 906 A.D., was conquered by Magyars, and its history follows that of Hungary, which has always retained its individuality as a separate kingdom.

We thus see that at one time or another the component parts of the Czecho-Slovakia Republic have all formed part of the Romano-Germanic Empire, and, indeed, of the Confederation of German States, which latter connection was severed by the peace of Prague, which was signed after the battle of Sadowa, 4th July, 1866.

The Republic now consists of the kingdom of Bohemia, Moravia, Austrian-Silesia and the northern part of Hungary (consisting of Slovakia and Ruthenia).

Bohemia being the most important part of the Republic it will be of interest to make a few remarks on her history, which is, to a certain extent, common to Moravia, and, in a lesser degree, Slovakia.

The Boii, "who gave their name to Bohemia," are the first known inhabitants of Bohemia and Moravia, and were followed by the Czechs, who were the chief Slav tribe to settle in Bohemia, where they seem to have appeared about the year 450 A.D.

In the ninth century the Moravians, under Svatopluk, built up a powerful empire, which included some of the Slovak districts of Hungary with part of the Duchy of Austria. The alliance between the Moravians and the Bulgars resulted in the introduction of Christianity into Bohemia by the Greek monks Cyril and Methodius in 864 A.D.

Early in the eleventh century Moravia was incorporated with Bohemia, where the Premysl dynasty had already been established, and therefore became part of the empire. This dynasty was formed by the marriage of one Libusha with a ploughman named Premysl. She has been described as a wonderful woman endowed with all the virtues and a gift for government. To Libusha is attributed the foundation of the city of Prague.

The next important feature of Bohemian history occurs in the reign of Brettislav I (1037—1055), who united Silesia, Bohemia, and Poland under one ruler, and thereby nearly attained the great aim of a western Slav empire, but the German influence was too strong and the Polish possessions were given up.

During the eleventh and twelfth centuries the German influence increased very rapidly. The clergy were almost entirely German, as may be gathered by the fact that the Bishop of Prague was subordinate to the Archbishop of Mainz. It was at this time that the German settlement in Prague was founded and the German language became the language generally spoken. The constant intermarriage between the Bohemian nobility and German princesses not only introduced into Court life more German officials and suites, but the children of these marriages were invariably taught the German language. Hence we find, in the thirteenth century, German towns and settlements began to increase, especially in the north and north-west. The monasteries encouraged the Germans to settle on their very large undeveloped estates, and it was from this time that Bohemia became Bilingual.

In the reign of Vaclav I (1230—1253) the great invasion of the Tartar Barbarians took place. They invaded Moravia after over-running northern Hungary, but were defeated by the Bohemians at the Battle of Olmütz. Some historians say that this battle not only settled the future of Bohemia, but the future of Europe itself.

The Premysl dynasty came to an end with the death of Vaclav III in 1306, and the then Emperor of the Empire appointed his son, Rudolph of Hapsburg, King of Bohemia; and thus we see the house of Hapsburg introduced for the first time as a ruler of the kingdom of Bohemia. He only reigned one year.

The next king of note is John of Luxemburg (1310—1346), who was known as the Blind King of Bohemia, and fell at the battle of Crecy. The Prince of Wales is supposed to take his crest and motto from King John, but authorities differ on this point.

We now arrive at probably one of the most important parts of Bohemian history, viz., the reign of King Charles I of Bohemia or Charles IV, Emperor of the Holy Roman Empire, 1346—1378. It was said of him that he made a better King of Bohemia than an Emperor of Germany. Although he belonged to the House of Luxemburg, he appears to have been a Czech at heart. During his reign Moravia and Silesia, as well as upper Lusatia, Brandenberg and Glatz, were, with the consent of their respective Diets, declared integral and inalienable parts of Bohemia. He founded the University of Prague in 1348, which, although situated in Bohemia, was the first German University. He enlarged and beautified the city of Prague and created it the seat of an Archbishopric. He also founded the town of Carlsbad, where he built himself a castle and "took the cure." At the time of his death the University of Prague had no fewer than 7,000 students. He gave a powerful impetus to the Czech language as he would not appoint German officials unless they could speak Czechish, which was the language used at the Court. He also insisted that the Czechish language was used for religious purposes, and with his death, in 1378, the end of the golden age in Bohemian history was reached.

He was followed by King Vaclav IV (1378—1419), and in this reign appears one of the outstanding characters in Bohemian history, the great John Hus. Hus was born in the market town of Husinec in Southern Bohemia in 1373. He graduated at the University of Prague in 1396, and, although at the commencement of his career was a strong Roman Catholic, in 1402 he came under the influence of two English theologians, James and Conrad of Canterbury, both being disciples of Wycliffe. He became Rector of Prague University in 1402, at which time it is interesting to note that the University was administered by officials selected by the representatives of students and masters of the four nations into which they were organised for this purpose. These "nations" were :—

1. The Bohemian Nation, which included those members from Bohemia, Moravia, Hungary and other Slavic lands.

2. The Bavarian Nation, which included Austria, Swabia, Franconia and the Rhine lands.
3. The Polish Nation, which included Silesia, Russia and Lithuania.
4. The Saxon Nation, which included Thuringia, Norway, Sweden and Denmark.

This indicates that the University of Prague must have held a very high place in Europe when we find students coming from so far afield as Norway and Sweden. Each nation having one vote, it was very easy for the foreigners to combine and defeat the Bohemian nation, and this was done very frequently. Hus retired from the Rectorship, and his successor, one Walter Harasser, a German, at once called an academical meeting, and presented for its examination the 45 Articles extracted from the writings of Wycliffe. Hus and the Bohemians, after a stormy debate, were defeated by the foreign nations, and thus began what was known as the Hussite wars.

In 1409 the King altered the system of voting by the decree of Kutna Hora, which gave the Bohemians three votes and the combined foreign nations only one. Thereupon 5,000 German students and professors, with some of the other foreigners, left Prague. They went to Leipzig, and there founded the first University in Germany. There now follows a long period of fighting between Hus and his followers and the Papal authorities, which ended in his death by being burnt at the stake at Constance, 6th July, 1415.

The cardinal point in the Hussite Creed was the manner of the administration of the Holy Communion. The Greek Church held to the ancient practice, viz., the Communion being administered in both kinds to the laity, whilst the Roman Catholic Church maintained that the priest might partake of the cup alone. This was known as the Utraorst doctrine.

After the death of Hus a military leader of considerable eminence in the person of John Zizka became the champion of the Hussite cause, and when Pope Martin V proclaimed a crusade against Bohemia, Zizka undertook its defence. I mention this episode in order to show once more how Bohemia seems to have continually attracted large numbers of foreign nations. The crusaders numbered more than a hundred thousand men, and included Germans, Hungarians, Croatians, Bavarians, Saxons, Austrians, Swabians, Frenchmen, Spaniards, Poles and English—no fewer than 16 nations. They were led by many German princes, including the Archbishops of Mainz, Cologne and Treves, also the Duke of Austria. The objective of both armies was Prague. The crusading army was totally defeated by Zizka, and an historian says that those nobles of Bohemia who sided with the crusaders were highly incensed at the barbaric conduct of the retreating Germans, who "scoured the neighbouring country, burning as heretics all Bohemians without any distinction whatever." Further comment is unnecessary.

The reign of George of Podebrad (1458—1471), the only Hussite King of Bohemia, was also one of importance. He was elected by the Diet, and was known as the first Heretic King in Europe.

After two reigns the Crown of Bohemia was for the third time awarded to the House of Hapsburg, in the person of Ferdinand I, where it remained until the end of the great war.

King Rudolph II (1576—1612) was famous for his attempt to arrive at some conclusion on the question of the rights of his Protestant subjects. On the 9th July, 1609, he issued his famous "Letters of Majesty," in which he granted religious tolerance to all. This led to his deposition and the succession of his brother Matthew, who was King of Hungary, which coincides with the beginning of the end of Bohemian independence. Matthew having left the Crown to Ferdinand II, the Catholics gathered their forces together, and at the battle of "White Mountain," 8th November, 1620, the fate of Bohemia as a nation was settled for more than two centuries.

This was followed by the 30 years war, which ended in 1648, and reduced the Bohemian population from three millions to 800,000. At the same time, Bohemia lost the whole of her rich national literature, which was destroyed by the Jesuits, and has never since been replaced.

During the reign of Maria Theresa (1740—1780) Bohemia again suffered, in that the greater part of Silesia and the county Glatz was given up by her to the Hohenzollerns, the exceptions being the provinces of Teschen, Jagerndorf and Troppau; the lands thus given up amounted to one-third of those belonging to the Bohemian Crown.

In 1804 the Holy Roman Empire disappeared, and Francis II became the Emperor of Austria. Austria began its career as the Ost-mark of the Frankish empire, and as a Duchy was given to the Badenburgs—a Teutonic family—who were succeeded by the Hapsburgs, by whose energy and capacity it was formed into a centre of a collection of hereditary possessions, some of them as large as kingdoms. These have existed up to recent years and have been incorrectly described as the Austrian Empire. As a matter of interest the last Emperor of Austria in State papers took the following titles: Emperor of Austria, King of Bohemia and Hungary, King of Dalmatia, King of Croatia and Slavonia, of Galatia and Lodomeria, King of Illyria, Grand Duke of Austria and of Bukowina, Styria, Carniola and Carinthia, Grand Prince of Silesia, Margrave of Moravia, Count of Hapsburg and Tyrol, etc.

Bohemia has a more marked individuality than probably any other country in Europe. Its formation is diamond-shaped, and the four points roughly correspond to the points of the compass. It has an area of about 20,000 square miles; three sides are bounded by ranges of mountains, and the fourth by highlands, the interior forming a basin which suggests at one time an inland sea. On the north-west, we have the Erzgebirge or Ore mountains which form the boundary against Saxony. They are of an average height of about 2,500 to 3,500 feet, the principal peak being the Keilberg, 4,080 feet. On this range is found the town of Gottesgab, which is said to be the most elevated town in Europe, 3,373 feet, at one time a busy mining centre.

On the north-east to the east of the Erzgebirge are the Elbsandsteingebirge, and beyond these the Adlergebirge, Isergebirge and the Lausitzergebirge. These mountains contain the highest peaks in Bohemia, viz., the Snowdome, 5,186 feet, and the Oldfather, 4.890 feet.

On the south-east the Moravian mountains, or which are better known as the Bohemian Moravian highlands, have no well-defined ranges or peaks, and this explains the ethnic unity of Bohemia and Moravia.

On the west is the Bohemian forest, which is divided into two parts by the Nepomuk Pass. The Northern section contains the Cerkow ridge, 3,300 feet. The southern section forms a wall of 4,500 feet in height, with a length of 78 miles to the Kuschwarda Pass, 2,640 feet. The mountains in this district are covered with Bohemian silver fir trees, which frequently attain the height of 100 feet. The forests are all under Government control, and trees are not allowed to be felled under 30 years of growth. There are numbers of small lakes found on the highest peaks.

All the rivers in Bohemia have their sources within its borders. The Elbe is the most important, with its tributaries Iser, Adler, and Eger. Tepl and Biela. The Moldau is the longest Bohemian river, and joins the Elbe at Schreckenstein, which is the Bohemian Lorlei. The rock is 300 feet above the level of the river, on which was situated a castle belonging to the Lobgowitz family, which was destroyed in the eighteenth century. In this district we have Saxon Switzerland, which is noted for its wonderful rock sculptures formed by the action of mountain streams on the very soft sandstone, Edmund's Klamm at Herrenskretschen. Other examples of similar formations are found at Jiciu and at Adersbach.

The climate is very similar to that of England, the winters are colder in the south than in the north, but never severe, and although healthy, owing to the bad housing conditions of the poorer classes, consumption is prevalent, and pneumonia accounts for many deaths; smallpox a few years ago was a regular scourge.

The agriculture was for the most part in the hands of large estate owners, and the peasants worked either as small-holders or as serfs until 1848, when reforms were effected by which their conditions were very much improved; but even at the outbreak of war 7.59 per cent. of the country was owned by the families of the Schwarzenbergs, Lichtensteins, Lobgovitz, Schonborns and Thuns. Before 1868 the peasants were not allowed to sub-divide their farms, which had to be bequeathed as a whole to one child; otherwise, it had to be sold as a whole. The natural consequence being that the land was generally purchased either by the nobilty or the Church, the latter being always a considerable landowner in Bohemia. After the Law of Partition in 1868 some 42,000 new farm holdings were formed in less than 20 years, and the farms of less than three acres were increased by 74 per cent after the passing of the Act. Some idea of the very small holdings of land may be obtained from the following table:—

| | | | | | |
|---|---|---|---|---|---|
| 1¼% | farms | 1½ acres | 15% | farms | 14 to 35 acres |
| 6¼% | ,, | 1½ to 7 acres | 20% | ,, | 35 to 70 ,, |
| 5½% | ,, | 7 to 14 ,, | | | |

The Jews have also become an important factor in the agricultural situation; they have gradually acquired very considerable tracts of land by the system of advancing money on mortgage and foreclosure, and when it is remembered that the landowners and the capitalist class are specially favoured in regard to the franchise they have thus obtained a very considerable control of the local legislation. It is true that great improvements have been effected during the last century, but their methods are, to my mind, even now a very long way behind the times—farm buildings badly kept up, dairies in a filthy condition, oxen still largely used in field work, physical feature of country made strange by the absence of walls and hedges, women labour still very largely used, bad housing of farm labourers, etc. The soil of Bohemia and Moravia is very fertile, more than half the surface being under the plough. The two countries together supplied between 40 to 50 per cent. of the total production of Austria, the main crops being:—

| | | | |
|---|---|---|---|
| Poppy ... ... ... | 83% | Flax fibres ... ... | 59% |
| Barley ... ... ... | 63% | Sugar beet no less than | 90.6% |

They produce more than their fair share of livestock, two outstanding facts being goats 48 per cent., and geese 59 per cent.; whilst the yield of game is even higher, 73 per cent. of partridges and rabbits, and 63 per cent. of the black game come from the two countries.

The large proportion of the country devoted to agriculture is illustrated by the following table showing the percentages of the various countries mentioned:—

| | | | |
|---|---|---|---|
| Bohemia ... ... | 51% | Austria Hungary ... | 38% |
| Germany ... ... | 47% | Austria (alone)... ... | 35% |
| France ... ... ... | 44% | United Kingdom ... | 23% |

Sugar beet growing has become one of the most important products of the country, a special impetus being given to this industry by the Civil War in America in 1860. Out of the total exports for the year 1919 of 5,323,621,196 kr. no less than 1,571,426,437 kr. represent the sugar exports.

Hops are another important product, and are of the very finest quality. They are grown principally in Bohemia, Saaz, Rakonitz, Podersam and Launn, being the chief centres.

Fruit and vegetables form the second largest export, with a total of 614,306,113 kr. Large quantities of apples, cherries, pears and plums are exported by way of the Elbe, and find their way in considerable quantities to the English markets. Several companies have been formed in Aussig for the drying and canning of fruits on modern lines.

The wine production is of little importance, and most of the wines, which are light, are consumed in the country.

Bohemia and Moravia are probably the richest part of the old Austro-Hungarian Empire in minerals, and that is the reason why we find so many manufactures within its borders. Brown and black coal is found in large areas, and the two countries provide together 43 per cent. of the black coal and 83 per cent. of the lignite found in the old empire.

Great quantities of brown coal were exported to Germany by way of the Elbe before the war, and as this is the particular industry with which I have been personally acquainted for the last 20 years, I regret I have no time at my disposal to enlarge on its possibilities of extension and the working conditions of the trade in general.

The iron ore production in Bohemia and Moravia amounted to 35 per cent. of the Austrian production, the chief ironworks being the Prague Iron Industry Company, the Poldihütte Coal Company of Kladno, and the Libsic Ironworks, Prague, all mainly under German direction.

The only silver produced in any quantity in the whole of the empire is found in Bohemia; the most famous silver mines are at Pribram; these have been working without a break since the year 755 A.D., and are believed to be the deepest mines in Europe; the main shaft is no less than 3.300 feet deep. Other metals found in lesser quantities are lead, tin, bismuth and antimony.

Bohemia is particularly rich in mineral watering places, Carlsbad, Marienbad and Francisbad being the most famous. Teplitz may also be mentioned as possessing some of the most famous thermal springs in Europe, having been in existence since the year 762 A.D.

The output of sugar in Bohemia and Moravia was 60 per cent. and 30 per cent. respectively of the total Austrian output. In Bohemia alone in 1913 there were 110 factories with a production of 791,900 metric tons (refined and raw), 16 large factories are under German direction and the remaining 51 are Czechish companies.

The brewing trade is an important one, having its chief centres at Pilsen and Prague; the former is famous for its town brewery, the shares in which are attached to certain house property in the town. The limited companies' brewery is situated on the opposite side of the river, and the difference between the two beers is most extraordinary. The second largest brewery is the Smichow brewery of Prague, and there are in addition 19 large breweries in Bohemia and 11 in Moravia.

Nearly every large estate has its own distillery, the two countries being responsible for 35 per cent. of the total spirits distilled in Austria. Molasses are used extensively in distilling, although potatoes are used in certain districts.

Porcelain and glass form the most important industries of the north and western parts of Bohemia. The export of these articles takes the third place on the list of exports, with a total of 370,267,850 flr. China clay of the finest quality is found in the Carlsbad, Kaaden, Pomeisl and Wildstein districts. Porcelain is manufactured in the smaller towns in the Eger valley between Elbogen and Teplitz. The Bohemian glass is world-famous. About nine per cent. of the world's output of glass bottles comes from Bohemia and Moravia, whilst sheet glass and mirror glass are produced in considerable quantities. The Gablonz district is noted for glass beads, buttons and imitation jewellery.

The cotton industry has made great strides of late years, the great centre being Wannsdorf, not far from Zittau, on the Prussian Silesian frontier. Of the 1,119 mills in the country, 62 are in this district, the others being situated in Prague, Neustadt, Horitz and Turmitz. The woollen industry has 59 per cent. of the looms in Austria located in Bohemia and Moravia, the principal districts being Reichenberg, Asch and Eger. Weaving and spinning is found at Bruun. Carpets are manufactured at Reichenberg and Eger, and lace gloves and flax spinning are all more or less important industries.

The manufacture of machinery is distributed as follows: Locomotives and railway plant at Prague, Pilsen, Aussig, and Kolin; electrical plant at Prague; sugar machinery at Prague, Bruun, Schlan and Aussig; textile machinery at

Prague and Bruun; machines and motors at Riesengebirge, Prossintz, Blankso, etc.; ordnance at Pilsen.

Prague, as the capital of the Republic, is not only the political and intellectual centre, as in past years, but has also become the industrial centre, having nearly all the important industries represented; it is also the banking centre. It has two Universities, the first being the oldest German University in existence, but since the war of 1866 and the severing of Bohemia from the confederation of German States, Prague has become, within the last 20 years, a purely Czechish town. The Czech National University was founded in the year 1882. Also a National Museum with Pantheon for national festivals and a national theatre.

All public notices, names of streets, etc., are printed in Czechish, and even before the war it was difficult to obtain information from the police and other officials if German was spoken.

The city of Prague is in reality a number of small towns which have become united or connected by the half-dozen bridges over the Moldau. On the right bank of the river are situated the Oldtown, Josephtown, Newtown and Vysehrad; on the left bank Smalltown, Hradcany and Holesovice-Bubny. Prague, with its suburbs, had, up to the time of the war, a population of about half a million.

The Charles Bridge connects the Smalltown with the Oldtown. First stone bridge by Vaclav IV in 1167, and was destroyed by flood in 1342. The present bridge was commenced by Charles in 1357, and the statues which line both sides of the bridge were not added until the seventeenth and eighteenth centuries. The bridge was partially destroyed by flood in 1890, and rebuilt immediately. It is about 550 yards in length, with very fine Gothic towers at each end. The tower on the Oldtown side carries the armorial bearings of all the countries once united with Bohemia, also statues of Charles IV and Vaclav IV. On the Smalltown side of the bridge there are double Gothic towers, the lower tower dating from the thirteenth century. Twenty eight statues consist of Bohemian saints, the principal being St. John of Nepomuk in bronze and St. Phillip Benetius in marble. There is a wooden cross flanked by statues of the Virgin and St. John the Evangelist. This cross was saved from the ruins of the old bridge, and is now replaced by one of stone, and bears an inscription to the effect that it was placed there at the expense of a Jew as a penalty for mocking the Cross.

The Town Hall, famous for its astronomical clock which, besides giving the hour of the day, the rising and setting of the sun and moon, also presents a procession of moving figures which include the Twelve Apostles, and when the clock strikes the hour a cock crows and the figures move round in procession; the clock tower date is 1381. The old Council chambers contain a panel and carved ceiling suspended on gilt chains, also two colossal paintings by Brozek—Trial of John Hus at Constance and Election of George Podebrad as King of Bohemia. In an adjoining square the Protestant nobility were executed in large numbers after the battle of White Mountain, 1621.

The Powder Gate is about the only existing evidence of the fortifications of the Oldtown, dates from the fifteenth century and now finds itself in one of the busiest parts of Prague.

Josephtown contains probably oldest Ghetto in Europe—narrow and very filthy streets now rapidly disappearing—Synagogue is reputed to be the oldest in Europe—Old Jewish Town Hall, with a clock with hand moving from left to right—Jewish burial ground over 800 years old, contains the remains of many famous Jews. Interesting tombstones, with symbols indicating a tribe to which the deceased belonged, viz., "uplifted hands," indicating "House of Aaron," a pitcher, indicating "House of Levi," etc., etc. A Jewish settlement in Prague said to be the oldest in Europe. The old moat, now transformed into one of the finest streets in Europe.

Hradcany or Kremlin—consisting of castle, cathedral, churches, monasteries, arsenal and parks. Wonderful position overlooking Moldau and is both picturesque and interesting—home of Bohemian rulers for over 800 years. Original buildings burnt down in 1303, part of present buildings date 1346—1378 (Charles IV); many parts destroyed during various sieges. Rudolph II seems to have done most to the buildings by way of restoration and additions. Rarely occupied by Bohemian rulers after Rudolph's time. Most ancient of present building is Gothic Hall, 1484, 235 feet long by 62 feet wide. It is said that at banquets given in this hall the attendants rode on horses. The towers were used as State prisons. Room known as Council Chamber; window from which the Imperial

Councillors were thrown in 1618 known as the Defenestration of Prague and the immediate cause of the 30 years war. Cathedral Church of St. Vitus commenced in Charles' reign, and not completed until 1859. A number of Bohemian kings and queens are buried here. It also contains the tombs of St. John of Nepomuk, and of St. Vitus the Patron Saint of the Cathedral.

Abbey of Strahov, with fine collection of pictures—library contains 100,000 volumes and very rare manuscripts. Most of the palaces are adjacent to Hradcany or in the Smalltown belonged to Counts Cervin, Thun, Schwarzenburg, Martinic and Waldstein.

The Bohemian Ethnographic Museum was organised in 1895, and is extremely interesting, showing as it does the history of Bohemia in dress, furniture, art, music and so forth.

Bohemian National Theatre—opened in June 1881, and destroyed by fire the same year—rebuilt in 1883; Rudolphinium 1884, with picture gallery, and famous National Conservatoire of Music. There are also two concert halls and Industrial Museum.

Other commercial towns in Bohemia are :—

| | | |
|---|---|---|
| Pilsen ... ... | 70,000 pop. | Brewing industry. |
| Reichenberg ... | 23,000 „ | Hop-growing and machinery. |
| Budweis ... | 40,000 „ | Ornamental glass and paper industry. |
| Eger ... ... | 24.000 „ | Distilleries, brewing, sugar refining. |
| Aussig ... | 37,000 „ | Textile trades. |
| Brux ... ... | 22,000 „ | Beer, earthenware, etc. |
| Dux ... ... | 12,000 „ | Machinery and cloth. |
| Saaz ... ... | 16,000 „ | Barge building, chemical industry. |
| Gablonz ... | 21,000 „ | Coal fields. |
| Pardubia ... | 17,000 „ | Coal fields, glass, porcelain. |

In Moravia we have a different conglomeration of races, three-fourths belonging to the Slav race, viz., the Czechs, Horaks, Hanaks and Slovaks, the remainder being Germans and Jews and Vlachs. The German element is found in that part of Silesia which was taken from Germany.

Moravia is separated from Silesia on the north-east by the

Sudetic Chain Mountains, with the highest peaks the Altvater, 4,874 feet, and the Schneeberg, 4,664 feet. On the west, the Bohemian Moravian Highlands, with an average height of 1,500 to 2,000 feet.

On the south-east are the Mars Mountains and the Steinitzerwald; these mountains run parallel to the White Carpathians.

The Morava or March is the principal river, and flows from north to south, and forms part of the south-eastern boundary of Austro-Hungary, and joins the Danube at Pressburg. The chief tributaries are the Thaya, Iglawa and the Schwarzawa.

The area of the Margravate is 8,580 square miles, 97 per cent. of which is highly productive.

The Moravians as a race have all through their history been extremely conservative in holding to the national dress and customs, and have been very much less progressive than the Czechs in Bohemia. The Horaks and Hanaks may be considered the most predominant element in the country, and it is largely owing to their influence that the native costumes which are still worn to-day are so very picturesque. The young men are particularly picturesquely dressed. The Horaks occupy the mountain spots, and have progressed less than any other of the Slovakian elements in the country. The Hanaks occupy the more fertile river valleys, and are both industrious and thrifty. The female population have a reputation for beauty of a very substantial sort. The Slovaks are both physically and intellectually inferior to the Czechs. They are great breeders of sheep and cattle, and the women are very famous for their embroideries. The Vlachs are mostly shepherds, and occupy the mountains in the north-eastern part of the Margravate. They have little education, but are a hardy, good-natured race.

The German and Jewish element in Moravia constitutes little more than a fourth of the population, but owing to the fact that they are the intellecual superiors of the Moravians, and by an ingenious manipulation of the electorate, they have for a very long time been able to maintain a majority in the Moravian local Parliament. We therefore find that the political, economical and industrial matters are left largely in the hands of the Germans and Jews.

Moravia is probably better known in Western Europe by the religious sect as the Moravian Brethren or Bohemian Brethren, which arose out of the Hussite Reformation. The organisation of this sect dates from 1467, but, owing to the Roman Catholic persecution which followed a little later (one of the main points being the suppression of the national language in religious worship) the members of the sect left the country in large numbers and fled to Saxony, Poland and Hungary. From Saxony, which became the headquarters, missionaries were sent out all over the world.

The capital of Moravia is Brünn, with about 130,000 inhabitants. It is also the chief industrial city: a quarter of the population being Jews and Germans. Its municipal liberties were granted to the town in 1229 by King Premysl, and its book of Rights can still be seen at the Council House.

The town is overlooked by Spielberg, on which is a castle that served as a Government prison. It was noted for its terrible torture cells, which only fell into disuse as recently as 1855.

There are several mediæval churches and an industrial museum. The principal industries are manufacture of machinery, metal wares, leather and woollen goods.

Mährich-Ostrau is a coal-mining and manufacturing town of 60,000 inhabitants.

Iglau, with a population of 26,000, is the centre of a mining district. It was at one time a German settlement. Civic rights granted in 1243.

Olmütz, formerly the capital of the Margravate, is situated on an island on the river Morava. There is a Gothic cathedral containing the remains of King Vaclav III, who was assassinated there in 1306. The Archbishop of Olmütz resides there. It was at one time a university town, but there is only a theological college left. Town Hall with a curious astronomical clock, fine public square and promenades. Chief industries brewing, distilling, milling and chemicals.

The Duchy of Silesia, which before the time of Frederick the Great had an area of nearly 18,000 square miles, and was part of Moravia when it was a kingdom, has (so far as that part of it which is now included in the Czecho-Slovakia Republic) only an area of about 2,000 square miles. It was included in the kingdom of Bohemia in the tenth century, and the Germanisation of the Duchy began in the thirteenth century. As already mentioned, Maria Theresa, in 1742, gave up to Prussia practically the whole of Silesia with the exception of the provinces of Troppau, Jagerndorf and Niesse.

The history of Silesia is extremely interesting.

Silesia is situated in the Sudetic Mountains region. It is separated from Hungary by the Carpathian mountains, and on the west by the minor branches of the Sudetic ranges.

The Vistula rises in the Carpathian mountains in Silesia, and the Oder flows through part of the province with its principal tributaries the Oppa and the Mohra. None of the rivers in Silesia are navigable except for small boats.

The population is about 750,000, and consists of—

| | | | |
|---|---|---|---|
| Germans ... ... | 43.90% | Czechs and Slovaks | 24.33% |
| Poles ... ... | 31.72% | Jews and others ... | .05% |

The Germans dominate the province in that they hold most of the administrative offices, the large estates and the commercial undertakings. The Polish part of the population consists mainly of small farmers and labourers.

The climate is cold and wet and violent changes of temperature are frequent.

Silesia is very much less fertile than Bohemia. About half the area of the country consists of arable land, and about 12 per cent. is devoted to hay or pasture. The chief crops are oats, rye, clover, potatoes, barley and wheat. Fruit is also grown, and a small amount of wine is produced. Dairy farming is prosperous, and deer, fish and small game are plentiful.

The principal product is coal, which amounts to more than a fifth of the whole of the output of the Austrian Empire. Lignite, iron and other metals are found, but in very much smaller quantities.

Silesia is intensely industrial; the total number of factories before the war was 677—more than one-third of the number in Moravia, a country more than four times its size. The textile industries are next in importance to coal. The woollen industry has its centres at Jagerndoff and Bieltz. The cotton industry employs a number of hands, and is situated at Freudenthal and Friewaldau. Jute spinning and rope making is another of their industries. Machinery is manufactured in the capital town of Troppau. Chemical works and oil refineries are found at Oderberg. Brewing and distilling are carried on on a very small scale.

The capital of the province is Troppau, with 30,700 inhabitants. Other towns are:

| | | | |
|---|---|---|---|
| Polnish-Olstrau, population | | ... | 22,900 |
| Teschen | „ | ... | 22,500 |
| Bielitz | „ | ... | 18,600 |
| Jägerndorf | „ | ... | 16,121 |
| Karwin | „ | ... | 15,800 |

The chief watering-places are Grafenberg, Karlsbruun, Lieudewiese and Astrou.

Slovakia forms the eastern part of the Czecho-Slovakia Republic, and before the war formed the northern part of Hungary. On the west and north-west it is bounded by the White Carpathians and the west Beskid range of the Great Carpathians. On the south-east and south by the rivers March and Danube as far as Gran. From thence by the river Eipel, and from this point the boundaries follow the various countries taken from Hungary until we reach the river Theiss, which forms the most eastern boundary of Ruthenia. On the north-east and north we have the east Beskid range of the Carpathians.

There are numerous ranges of mountains inland, the highest points being the Gerlsdorfer Spitze, 8,700 feet, the Djiumbir, 6,700 feet, and the Krivan, 8,000 feet.

The rivers belong almost entirely to the Danube system. On the west of Slovakia the March, with its tributary the Mirva, and the Waag are most important. Further east, are the rivers Gran and the Eipel, and still further east is found the river Theiss, one of the largest tributaries of the Danube, and has for one of its chief tributaries the Hernard.

The Danube and the Theiss are the only navigable rivers, although some of the others mentioned are fairly extensively used for the purpose of floating timber, etc.

The principal lake in Slovakia is Lake Csorbia, and is a favourite resort.

The mountainous character of the country means a corresponding degree of cold, and the Danube is sometimes frozen from November to March. The sanitary conditions are bad, as also the housing. Malaria, intermittent fever and diphtheria are responsible for a great many deaths, while tuberculosis is prevalent. Medical attendance is very scarce, which is evidenced by the fact that 60 per cent. of deaths are not certified by a doctor.

The last census in 1910 the population of Slovakia was roughly 3,420,000. The population consists of Slovaks, Ruthenes, Magyars and Germans. About 50 per cent. are Slovaks, 36 per cent. Magyars and 6 per cent. Germans. The Slovakian language is recognised as a distinct Slavish dialect, and very much resembles Czechish. The majority of the Slovaks are Roman Catholics.

The three largest towns in Slovakia are Pressburg, the capital, with 80,000 inhabitants; Kassa, the centre of the iron district, with 44,500; and Waitzen, a cathedral city, with 19,000.

Agriculture has not made the strides in this part of Czecho-Slovakia which is the case in Bohemia and Moravia, owing to the very poor condition of the population and the lack of education. Their methods are extremely primitive, and it is only the more enlightened estate owners who have introduced machinery to make up, as far as possible, for the periodical lack of labour. All kinds of grain are grown in considerable quantities, together with potatoes and beet. Wine and fruit are produced in fairly good quantities, and the famous Imperial Tokay Wine is grown in Slovakia. Tobacco is also cultivated in considerable quantities, but of late years has shown a distinct tendency to decline. Timber is plentiful, and over half of the wooded areas are under State management. The Slovaks, as a nation, are mostly shepherds, and are extremely conservative, which accounts for the fact that they have retained their national costumes and customs to a greater degree than the other races now making up the Czecho-Slovakia Republic. As already stated, education is in a very backward state. They are famous for their folk-art, their music and their dancing, and a considerable portion of their music finds its way to Western Europe under the misnomer of Hungarian rhapsodies!

Minerals are found in considerable quantities; coal and iron are the two principal industries, but considerable quantities of copper, zinc and antimony are found within its borders. It also produces 70 per cent. of the manganese ore found in the (former) Hungarian kingdom. Gold is found in small quantities, whilst the amount of silver produced amounts to 33 per cent. of the total raised in Hungary.

Ruthenia is situated at the entreme eastern end of the Republic, and is mostly agricultural. The capital is Ungvar.

Having thus roughly sketched the history and geographical features of those provinces which now form the Republic we must now consider the results accruing from the Peace Conference which recognise the Republic as we know it to-day. Before the war the Austro-Hungarian Empire had an area of 260,000 square miles. Of this area Austria had 134,000 square miles, which has now been reduced to 32,000 square miles, with a population of 7,150,000, of which no less than a third are found in Vienna. When one realises that Austria has lost all its richest industrial and agricultural provinces the terrible distress, not only in Vienna but in Austria, is very easily realised.

Hungary, with an area before the war of 126,000 square miles, has been reduced to 36,000 square miles, with a population of 8,000,000.

In the old Austro-Hungarian Empire we found the following nationalities: Czechs, Moravians, Slovaks, Germans, Poles, Slovanes, Serbs, Croatians, Italians, Rumanians, Magyars, and other foreigners.

In the Republic, of the above races we find Czechs, Moravians, Slovaks, Germans, Poles Magyars and other foreigners.

Six languages appear on the Czecho-Slovakian paper money, viz., Czechish, Polish, Slovak, German, Russian and Magyar.

The population, in 1910, of the Republic (or rather those parts which now form the Republic) was about 13,811,000, and was roughly divided up as follows:—

| | | | |
|---|---|---|---|
| Czechs ... ... | 45% | Ruthenes ... ... | 3.1% |
| Germans ... ... | 27.7% | Poles ... ... ... | 2% |
| Slovaks ... ... | 13.3% | Foreigners ... ... | 1.1% |
| Magyars ... ... | 7.8% | | |

Religious questions have ceased to be of any importance in the Republic; the majority of the inhabitants are Catholics, and since the Republic was formed they have formed a branch of the Catholic Church whereby the language of religious services will be Czechish, and freedom to marry will be given to the priests. During my last visit in October (1920) a great outcry was being raised against the Government for allowing the old Roman Catholic churches and property to be annexed by the new State Church.

Although in the list of nations just mentioned the Slavish races are undoubtedly in the majority, it is very questionable whether they will be able to dwell together in harmony as was hoped by the founders of the Republic. The German-Austrian element has always been a disturbing factor in the situation, but it must be remembered in fairness to them, that, although they only form about 27 per cent. of the whole population, that 27 per cent. represents a very much larger percentage of the capital and industry in the Republic.

Both the Germans and Czechs are well educated, and Bohemia is probably better off than any part of the Republic in the matter of schools, etc. Here again the burning questions of "language" crops up, and the schools have furnished the battle ground of the races for many years.

The German Schulverein was the first and wealthiest organisation in the field.

In 1880 the Czechs founded the Matice Skolská (Mother of Schools). This organisation provided the schools, and compelled the Government to take over the schools when there were sufficient children to entitle them to State support. The funds for this organisation were collected by the sale of postcards, stamps, and by means of Heller collections. Down to 1912 the Matice had spent £600,000 on schools in mixed districts. German and Czech employers bring pressure to bear on their employees to induce them to the school of their employers' nationality.

For many years the Germans, having dominated industry, the higher grade schools (which are very numerous) are attended by twice as many Germans as Czechs.

At the end of 1914 there were 3,359 Czech elementary schools, as again 2,334 German in Bohemia.

The Czechs formed 63 per cent. of the population, and had only 59 per cent. of the schools. In Moravia the Czechs had 1,896, and the Germans 741 schools.

Silesia was well provided with schools, the Germans having the majority. Slovakia was very badly off; in 1912 there were only 240 schools educating 8 per cent. of the Slovak-speaking children.

The Czechs have now come into their own, and at the time of my visit to Czecho-Slovakia in October (1920) the Germans in north-west of Bohemia were—or thought they were—being extremely badly used by the closing of German schools and classes (38 German schools and 576 German classes).

Sokols. This organisation was founded in 1862, and was primarily for the purpose of gymnastic training, but soon became the means of binding the Slavish races together. They organised libraries, public reading rooms, gymnastic halls, etc., and have held several influential conferences and re-unions, the last being in 1920 at Prague.

The National Debt is estimated as under:—

| | | Kr. |
|---|---|---|
| Internal loans (omitting last State loan which is to be exchanged for the old war loan issued by the Old Empire) ... | | 3,277,800,000 |
| Paper money in circulation, Nov. 1920 ... | | 10,861,357,533 |
| America ... ... ... | $91,000,000 | |
| France ... ... ... | Frs.110,000,000 | |
| Italy ... ... ... | Lrs.26,000,000 | |
| Russia ... ... ... | Frs.5,000,000 | |
| England ... ... ... | £336,116 | |
| | | 5,148,500,000 |
| Total ... | | 19,287,657,533 |

To these figures are to be added interest charges. No account has been taken in the above figures for the Republic's share in the old Austro-Hungarian pre-war debt, which amounted to 12,665,000,000 kr. (old value of krone). A former Finance Minister (Dr. Rasin) calculated that between 27—34 per cent. would fall to Czecho-Slovakia. The interest charges would be about 800,000,000 kr. yearly.

There is also the war debt which will also have to be assumed by the Republic. The Finance Minister, in a speech last year, stated that, taking everything into consideration, the National Debt was about 40,000,000,000 kr.

The estimates for 1921 may be of some interest:—

| | Kr. |
|---|---|
| Estimated ordinary expenditure ... | 9,172,265,936 |
| Estimated extraordinary expenditure ... | 4,932,108,714 |
| | 14,104,374,650 |

To this total is to be added bonuses to Government officials for increased cost of living, 1,200 millions, and a further 500 millions for educational staff. The total expenditure works out at 469 kr. per head of population.

Dr. Rasin (the leader of Czechish National Party), in his criticism of the Budget, compared the Republic State expenditure with that of the Old Austrian, and found that, taking into account the change in the value of the krone, the estimated expenditure for 1921 was:—

| | Kr. |
|---|---|
| Austro-Hungary ... ... ... | 4,806 millions |
| Less State Loan charges ... ... | 840 „ |
| | 3,966 „ |

The Czecho-Slovakia Republic is roughly about 1/4th of Austria-Hungary, and their estimates amount to 10,000,000,000 kr.

One of the reasons for the tremendous expenditure in the Republic is the enormous number of Government officials appointed since the formation of the Republic. There are no fewer than 116 Ministries. Austria had 10 and Hungary 7.

The War Office alone is responsible for 17 per cent. of the total expenditure, as against Austria-Hungary's 12 per cent. In this connection, it is interesting to note that 43,000 000 kr. is paid as staff and other salaries, of which 13,000,000 kr. goes to the French Military Mission.

There are 61 Generals, 116 Colonels and 174 Lieutenant-Colonels for a total strength of 150,000 men. Of these officers, 8 Generals, 13 Colonels and 20 Lieut.-Colonels belong to the French Military Mission. There are in addition to the above, a further 12,000 officers of other ranks, so that there is one officer for every ten men in the Republican Army.

The Government appears to employ a total of 250,000 officials, clerks, etc., and this does not include 43,000 schoolmasters.

Income for 1920-21 was estimated as follows:—

| | Kr. |
|---|---|
| 1. Real property taxes ... ... ... | 194,846,000 |
| 2. Personal taxes ... ... ... ... | 558,638,240 |
| 3. Other direct taxes ... .. ... | 250 054,000 |
| | 1,003,538,240 |

| | | |
|---|---|---|
| Taxes on industries ... ... ... ... | | 2,008,124,410 |
| Other taxes and duties ... ... ... | | 1,404,896,879 |
| Government monopolies (surplus after payments): | | |
| Tobacco ... ... ... | 444,159,585 | |
| Salt ... ... ... ... | 16,040,100 | |
| Sweetstuffs ... ... | 39,858,000 | |
| Explosives ... ... | 20 805,000 | |
| State Lotteries ... ... | 9,863,906 | |
| | | 539,726,586 |
| Customs .. ... ... ... ... | | 188,376,500 |
| | | 4,141,124,375 |

The income from some of the principal industry taxes are :

| | Kr. |
|---|---|
| Spirits ... ... ... | 255,000,000 |
| Beer ... ... ... ... | 99,300,000 |
| Sugar ... ... ... | 329,500,000 |
| Coal ... ... ... ... | 1,200,000.000 |

As an example of the taxation, we will take as an instance a person with an income of 100,000 kr. :—

| | Kr. |
|---|---|
| Usual tax for his class of income ... ... | 5,000 |
| Additional war tax, 250% ... ... ... | 12,500 |
| 300% town or village rates, taxes, etc. ... | 15,000 |
| 150%Land and county taxes ... ... ... | 7,500 |
| | 40,000 |

A limited company with a net profit of the same amount would pay 70 per cent. in taxes.

The nominal strength of the Army is now 150,000 men. The estimated cost for 1921 by the Ministry of Defence was 2,368,830,110 kr. Investments in military property, *i.e.*, barracks, etc., 120,145,000 kr.; total, 2,488,975,110 kr.

| Value of exports and imports :— | Kr. |
|---|---|
| In the year 1919 the imports were valued at ... | 6,555,418,562 |
| The exports were valued at ... ... ... | 5,323,621,196 |

| | |
|---|---|
| The largest export was that of sugar, which amounted to | 1,571,426,437 |
| Fruit, vegetables, etc. | 614,306,110 |
| Glass | 370,267,850 |
| Iron and steel | 314,849,137 |
| Paper, etc. | 181,147,385 |
| Liquors | 115,312,662 |
| Cotton goods | 100,323,807 |
| Woollens | 322,342,640 |
| Leather goods | 144,689,829 |
| Wooden goods | 114,456,493 |
| Chemicals | 132,880,213 |
| Machinery instruments | 111,908,899 |
| Musical instruments | 70,479,252 |
| Sweets, etc. | 81,235,744 |

The principal imports into the Czecho-Slovakia Republic come from the United States, 982,600,600 kr., or 20.42 per cent. of the total; Germany, 645,056,000 kr., or 14.9 per cent.; Italy, 535,630,000 kr., or 11.78 per cent.; Switzerland, 375,012,278 kr., or 8.25 per cent.; Austria, 321,255 050 kr., or 6.73 per cent.

The principal exports of the Czecho-Slovakia Republic to Austria are 672,850,000 kr., or 17.31 per cent. of the total; Germany, 629,640,000 kr., or 16.20 per cent.; France, 569,365,000 kr., or 14.65 per cent.; Poland, 344,715,000 kr., or 8.67 per cent.; Norway, 301,163,000 kr., or 7.75 per cent.

Great Britain's share of trade with Czecho-Slovakia is relatively small—imports, 330,980,000 kr.; exports, 254,100,000 kr., being 6.73 per cent. of the total imports, and 6.10 per cent. of total exports.

I have endeavoured to obtain reliable figures as to the investment of foreign capital (including German capital) in the Republic, but have been unsuccessful, but we find a large number of foreign firms operating in the country, although before the war many of them had their headquarters in Vienna. To mention a few: The Mannesmann Tube Company, with a capital of 20,000,000 marks, have works at Komotau; the General Electric Company have a large number of branches in Bohemia and Moravia, and two in Silesia; the German-Austrian Mining Company mines in Bohemia and Saxony headquarters.

# THE COMMERCIAL POSSIBILITIES OF KENYA COLONY.

By John Ainsworth, C.M.G., C.B.E., D.S.O., F.R.G.S.

(Delivered to the Society, December 9th, 1921.)

In dealing with the question of the commercial position and possibilities of the Kenya Colony and Protectorate it is both desirable and necessary to include, for the purpose of the general argument, the adjoining territories of Uganda and Tanganyika (late German East Africa) for the reason that the geographical position of the Kenya Colony is such as to make it practically the focus of commercial activity in connection with a large part of the areas named. By reference to the map the position in this respect will be fully appreciated.

When to this aspect of the case we find that the Uganda Railway, which is in fact, notwithstanding its name, the Kenya Railway, in that its whole length passes through that Colony and no part is in Uganda, is the only line of railway communication between the sea and Uganda and of a considerable part of the most populous and fertile districts of the Tanganyika Territory, it is readily seen that my contention has everything possible to support it, consequently that Kenya occupies a position of prime importance in East Africa from a trade point of view.

I would refer to the predominating feature of the great lake, the Victoria Nyanza. This vast sheet of water is surrounded by native Africans numbering some seven to eight millions inhabiting a very fertile country some of which is in Kenya and some in Uganda and the Tanganyika Territory. It will give you some idea of the importance attached to the possibilities of the great lake from a trade point of view when you bear in mind that the Government has for service on its waters 11 steamers with a cargo capacity of 2,285 tons, also 13 steel lighters with a cargo capacity of 1,340 tons. Before the war all this craft was regularly and fairly fully employed. In addition to the foregoing somewhere about one thousand tons of privately owned sailing craft is in existence.

On Lake Kioga, in the Uganda Protectorate, which helps to feed the trade which passes through Kilindini, there are three stern-wheel steamers,; these also carry the line of communications to Lake Albert and to Nimule on the Nile. Lake Kioga itself is connected with the Victoria Nyanza by the Busoga Railway which starts at Jinga near the Ripon Falls.

Kenya has railway access from Voi (mile 104 of the Uganda Railway) to the Kilimanjaro regions of the Tanganyika Territory, while Kilindini itself is in close touch with the coast ports of the territory.

The areas that actually come within the scope of Kenya's trade possibilities are :—

| | |
|---|---|
| Kenya Colony and Protectorate ... | 240,000 sq. miles |
| Uganda Protectorate ... ... ... | 125,000 ,, |
| Tanganyika Territory, including Ruanda, etc. | 385,000 ,, |
| Total ... ... | 750,000 sq. miles |

with a total population of approximately

| | | |
|---|---|---|
| | 11,500,000 | Natives |
| | 50,000 | Indians |
| | 15,000 | Whites |
| Total ... | 11,565,000 | |

Considerable parts of the areas indicated have up to now been only partly touched by trade influences.

The harbour of Kilindini is by far the finest natural harbour on the East African coast, in fact it is one of the finest natural harbours in the world. The present contemplated improvements in the way of facilities for dealing with shipping will tend to place it in the front rank of the world's ports and enable it to deal with practically any volume of trade and thus allow of it occupying in fact what nature intended it to be, *i.e.*, the emporium for the trade, not only of Kenya, but for the other territories I have referred to.

But for the war the commercial development of Kenya, Uganda and the Tanganyika Territory would by now have reached important dimensions, but, like other parts of the world, the war interfered with the progress which up to 1914 was being satisfactorily achieved. The war has, however, resulted in throwing what was German East Africa more into the sphere of our commercial operations; before the war this territory was naturally a producer and consumer in German interests. In 1912 the total export and import trade of German East Africa amounted in value to £4,085,000.

In all the territories concerned we have wonderful varieties of climate, of soil and the attendant conditions. The fertility of the varying agricultural lands is practically second to none in the world. The tropical lands are already proving their productiveness, and their extent is such as to permit of very large expansion. The sub-tropical lands are giving rich promise in the way of coffee, fibres and other products. The higher lands are blessed with conditions similar to the temperate zone.

The following represents the principal products of the combined areas:—Coco-nuts, Fibre and Copra, Sisal hemp Fibre, Flax and Wool, Cotton, Suri-sirn (Sesame), Ground nuts, Rubber, Hides and Skins, Wattle bark, Coffee, Maize, Beans and Peas, Wheat, Millet, Bananas, Citrus fruits, Beeswax, Timber, Natron (carbonate of soda), Sugar cane, Potatoes and Onions.

Several of these are already well established and are being exported in increasing quantities yearly. Sugar cane so far is only being utilized, in so far as sugar is concerned, in producing a form of brown sugar for local consumption, there are, however, already signs that this product will in the near future take an important position in the industries of East Africa. A factory for the manufacture of a spirit called Natalite for motive purposes has just been established, the hope of the promoters is that "Natalite" will succeed in replacing petrol which is so largely used in the countries referred to in this address.

Experiments are being made in the cultivation of tea; there would appear to be no climatic reason why they should not succeed.

Manioc or Cassava is grown in the tropical areas; from this plant tapioca and a certain kind of starch are made; this is a product that can be largely exploited with advantage.

The timber of all the areas is of varied kinds and is a most valuable asset and should soon bulk very largely in the export list.

In addition to the foregoing the countries generally are rich in live stock. It is estimated that the combined native holdings amount to 5,000,000 head of cattle and 15,000,000 sheep and goats, of which the Kenya natives alone possess somewhere about one and a half million head of cattle and five million sheep and goats.

The Government and stock-owning settlers have from time to time imported bulls and rams for the purpose of crossing with native stock; the result is proving most satisfactory. Non-native owned stock in Kenya amounts to approximately 500,000 cattle and 300,000 sheep.

Pig breeding is another industry of Kenya.

All the hams and bacon as well as all the dairy produce required for consumption in all the areas are produced in Kenya. I expect that before very long we shall hear of Kenya hams and bacon in England.

Before the war the native demand for imported goods was increasing in many directions; the war came and tended to reduce it. The greatly increased cost of manufactured goods after the armistice has unfortunately helped to retard any wholesale return to the pre-war demand on the part of the natives. I anticipate, however, that as prices become more reasonable the native trade will take fresh life and grow to important dimensions. There are two points to consider when dealing with the native as a consumer of imported goods, there are his actual requirements and the things he wants. At the commencement he has no such requirements, there are only certain things he wants, but as time goes on he finds he must have certain other things and these become essential requirements, gradually he wants more things, and so on, in the interests of trade the business is to get him to increase his wants. When, however, as has been and is the case to a considerable extent at present, the price is more or less prohibitive he finds he must do without wanting certain things he confines himself to his actual requirements.

In order to give you some idea of the trade possibilities of this part of Africa I must inflict upon you a number of figures with the idea of showing you how the commercial position has progressed in this country during the few years of its existence as a producer and importer, and to give you some idea of what a promising market the near future has in store given that we are prepared to take advantage of what is offered.

In 1896 the total imports and exports of the East Africa Protectorate (Kenya Colony) amounted to £250,697, a considerable proportion of the exports consisted of ivory from East Africa and Uganda. The latter area had then no other export product. The trade of German East Africa (Tanganyika Territory) for the same period amounted to nearly £300,000.

| | |
|---|---|
| In 1907-8 the combined imports and exports of the three areas amounted to ... ... ... | £3,820,462 |
| In 1912-13 the combined imports and exports of the three areas amounted to ... ... ... | £8,255,958 |
| In 1914-15 the combined imports and exports of the East Africa Protectorate (Kenya) and Uganda amounted to ... ... ... ... | £4,709,209 |
| (For this period I have no figures to show the trade of German East Africa.) | |
| In 1918-19 the combined imports and exports of Kenya Colony and Uganda amounted to ... | 5,352,810 |
| In 1919-20 the combined imports and exports of Kenya Colony and Uganda amounted to ... | 6,126,533 |

The imports during this latter period amounted in value to £3,119,536, and included 22,297,000 yards of cotton piece goods at an average price of 8d. a yard. In the same period the exports were valued at £3,006,997, which included cotton from Uganda to the value of £1,420,000 and Kenya £5,420.

The value of the imports into Kenya has up to now always been in excess of the value of the exports. This fact is due almost entirely to the fact that money has been, and is being introduced into the country for purposes of development and is paid to native labourers who expend it largely in the purchase of imported goods. This process must of course go on until such time as the capital invested begins to bring an adequate return when it is expected the balance of trade will become normal. A further explanation of the excess is that Kenya imports include goods intended for distribution to neighbouring countries.

As will appear evident to you the principal export from Uganda is cotton. The Uganda Economic Commission which sat in 1920 estimated that in that year there were 155,000 acres under cotton cultivation in the Protectorate and that the export for the year would amount to 50,000 bales. This estimate was, I understand, realized. The Uganda estimate for the present year is 70,000 bales.

Kenya itself has so far produced very little cotton, and I do not think the country will for some time yet respond in any great way in this connection.

Tanganyika Territory should become a large producer of cotton. In 1911 cotton to the value of £66,600 was exported, and 28,000 acres are said to have been under cotton cultivation during that year. In 1919 some 3,202 bales and in 1920 1,953 bales of cotton were exported from this territory to the United Kingdom.

In support of my contention as to the commercial position of Kenya in relation to the Tanganyika Territory I notice in the Kenya customs returns for 1919-20 that during that year produce to the value of £509,937 was exported from the Tanganyika Territory by way of Kilindini.

An important factor for consideration in dealing with the trade prospects of any country is connected with the communications and other facilities connected therewith. I have already dealt with the port and the steam boats on the Victoria Nyanza, but so far no particular allusion has been made to the railways, posts and telegraphs. The Uganda Railway itself starts at Kilindini and terminates at Kisumu on Victoria Nyanza. This railway has a total length, including the section from Mombasa, of 587 miles. From Voi (mile 104 Uganda Railway) a branch line (constructed during the period of the military operations) runs to Moshi at the base of Kilimanjaro, a distance of 100 miles. At mile 282 (Uganda Railway) a branch line, some 95 miles long, connects Magadi Lake, with its vast deposits of Natron (bicarbonate of soda), with the Uganda Railway. From Nairobi another branch line, the Thika Railway, runs to Thika, a distance of 32 miles. Thika is nearly midway between Nairobi and Kenya mountain.

In the Uganda Protectorate we have—the Busoga Railway connecting Jinja with Lake Kioga and passing through the principal cotton producing districts in the Uganda Protectorate; this line is 61 miles long. A length of six miles of line connects Port Bell, or, as it is sometimes called, " Kampala Port," with the town of Kampala, the latter being the chief trade centre of Uganda.

In the Tanganyika Territory we have—the Tanga-Moshi line, 218 miles long, and the Central Railway, 787 miles long. The former, which connects the port of Tanga with the Kilimanjaro area, passes through the Usambara district which is rich in present and potential agricultural production. The Central Railway connects Dar-es-Salaam with Kigoma on Lake Tanganyika.

The total railway is thus 1,890 miles. The intention of the Kenya authorities is to extend the Thika line so as to connect the rich agricultural lands which surround Mount Kenya with the main line. Also the construction of a line from Lake Nakuru (mile 452 Uganda Railway) over the Uasin Gishu Plateau, one of the most thickly European settled areas in the Colony, and thence to the North Kavirondo District, a rich native area.

As you will have observed quite recently a loan for £5,000,000 for the Kenya Colony has been placed on the market, the intention is to devote the greater part of this money to completing the Kilindini harbour works and to building the additional railway lines referred to. If this money is wisely expended, as I have no doubt it will be, the result will not only be extremely beneficial to the Colony but to British trade also. Extended communications and increased port facilities will mean increased development and consequently increased trade. I feel, however, that you can very well advantageously lend even more money to Kenya if it is required and also treat Uganda and the Tanganyika Territory in like manner; they are all countries that can and will make you satisfactory and ample return for any capital invested.

The service of Posts and Telegraphs increases yearly as the countries concerned increase their requirements. At present there are some 140 Post Offices and Postal Agencies in Kenya Colony and Uganda, of these 115 are also telegraph offices and 45 money order offices.

Kenya has somewhere about 3,100 miles and Uganda 1,055 miles of telegraphs. Kenya also possesses two wireless stations.

I have not got the figures dealing with the post and telegraph development in the Tanganyika Territory. Telephone exchanges are established at Mombasa, Nairobi, Kisumu, Entebbe, Kampala and Jinja with over 800 miles of wire.

The Eastern Telegraph Company has cable lines connecting Kenya and Uganda with Zanzibar and also connecting Dar-es-Salaam (via Bagamoyo) with Zanzibar.

As regards Banking, the National Bank of India, the National Bank of South Africa and the Standard Bank of South Africa possess branches at all the more important centres.

The question of Shipping to connect the country with the outside world is necessarily an important one. Before the war there existed fairly frequent and satisfactory services; possibly this was due, to some extent, to the presence of German competition (out of a gross tonnage of 1,311,906 which entered Kilindini in 1913-14 German steamers represented 607,263 tons). At the present time there is no German competition, and possibly due in part to this fact the over-sea services to Europe are irregular and unsatisfactory. There is undoubtedly room for great improvement, perhaps it will come when affairs generally become more normal. A further handicap in this connection is the high freight charges which help to hinder trade.

From what I have said it must be evident to you that East Africa generally is capable of being very largely developed as a producer and consumer, and that with such development there will be an ever-increasing market for British manufactured goods.

All the countries concerned are African countries and the predominating people living in them are Africans who must necessarily be the producers and workers under any scheme of development; it is, therefore, to the aggregate production and demand of the Black-man that we must look for any real expansion of trade and consequently of wealth for the country. White-men have undertaken and are undertaking ventures in all the areas and are helping in the general scheme of progress by introducing capital with a view to production, by showing the Blacks better methods of cultivation and by inciting them to applied industrious habits. The Black-man alone has little or no inclination to exert himself in any way that entails work, he would produce practically nothing for export and require nothing beyond what his forefathers did. The Black requires stimulation and, if he is to improve his condition by making better use of the fertile lands which are his, it is necessary for him to learn by precept and example the better methods of agriculture. Therefore his association with the white-man or any other race of a superior intelligence is in every way beneficial. What we all want is a progressive Black and a prosperous country, these can be better attained by association than by leaving the native to carry on in his own way.

I have noticed that some theorists when dealing with our position in Africa lay it down that our mission should be confined to protecting the natives and that we should safeguard them from "exploitation," also that we are not justified in subjecting the country to a system of "economic imperialism," or in other words that we should not attempt to turn Africa and the Africans to commercial account. I think we will all agree that it would be morally wrong to subject Africans or any other people to any system of wrongful exploitation, but that is another matter. Surely no real well-wisher of the African is prepared to say that it is wrong to attempt to bring him into a scheme of economic advancement under which he becomes a producer, a wage-earner and a consumer of manufactured goods. As regards the term "exploitation" I can assure you that over thirty years of practical contact and experience with many and various African tribes leave me with the absolute conviction that the African does not lend himself twice to "wrongful exploitation," and that therefore no sane person with an eye to future business will willingly wrongfully exploit a native. I think therefore we can leave the matter at that.

I am prepared to grant that the majority of Africans would prefer to be left to themselves and that in such a state they have little or no use for such things as commercial development. I contend, however, that it is no part of our mission to leave the African in his original state, history shows us what that would mean, it would not only mean a stagnant but a bloody Africa. Civilization and Christianity have crossed the African's path, and one of the civilizing agencies is trade, we must therefore progress with our work and duty and endeavour to make the African and his country commercial assets.

Africa is a country full of potential riches, so far we have only touched the fringe of its possibilities, if it is liberally treated and developed it should become one of the richest countries in the world for the reason that it is capable of producing almost unlimited quantities of nearly every kind of raw produce required in the world's industries. With the growth of production a corresponding large demand for manufactured goods will come into existence.

When we bear in mind the further point that this vast continent is almost at our very door the prospect of a commercially prosperous Africa must be of additional interest to us all.

I conclusion may I suggest that the Chambers of Commerce in this country undertake an intelligent and thirsty enquiry into the possibilities of trade with Africa, and with Kenya and its neighbouring territories in particular, and so help in assuring mutual benefits for all concerned.

## Review.

"Cambridge Geographical Text Books: Senior." By G. F. BOSWORTH, F.R.G.S. Cambridge University Press, 1922. 7/6 net.

This is the third of a series on the Concentric System and is very suitable for class purposes. While meeting examination needs, it does not present the matter as a mere accumulation of useful facts, but is full of interest and some local colour is given.

The illustrations and diagrams are good and what is most important in a text-book the type is large and the paper smooth and glossy. There are useful questions and exercises at the end of the book. It is one of the best of recent publications. G. R. S.

# APPLIED GEOGRAPHY.

By D. G. Hogarth, M.A., D.Litt., C.M.G.

(The Presidential Address delivered to the Geographical Section (E) at the Edinburgh (1921) Meeting of the British Association for the Advancement of Science.)

The term which I have taken for the title of my address has been in use for some years as a general designation of lendings or borrowings of geographical results, whether by a geographer who applies the material of his own science to another, or by a geologist or a meteorologist, or again an ethnologist or historian, who borrows of the geographer. Whether Geography makes the loan of her own motion or not, the interest in view, as it seems to me, is primarily that, not of Geography, but of another science or study. The open question whether that interest will be served better if the actual application be made by the geographer or by the other scientist or student does not concern us now.

Such applications are of the highest interest and value as studies, and, still more, as means of education. As studies, not merely are they links between sciences, but they tend to become new subjects of research, and to develop with time into independent sciences. As means of education they are used more generally, and prove themselves of higher potency than the pure sciences from which or to which, respectively, the loans are effected. But, in my view, Geography, thus applied, passes, in the process of application, into a foreign province and under another control. It is most proper, as well as most profitable, for a geographer to work in that foreign field; but, while he stays in it, he is, in military parlance, seconded.

Logical as this view may appear, and often as, in fact, it has been stated or implied by others (for example, by one at least of my predecessors in this chair, Sir Charles Close, who delivered his presidential address to the section at the Portsmouth Meeting in 1911), it does not square with some conceptions of Geography put forward by high authorities of recent years. These represent differently the status of some of the studies, into which, as I maintain, Geography enters as a subordinate and secondary element. In particular, there is a school, represented in this country and more strongly in America, which claims for Geography what, in my view, is an historical or ethnological or even psychological study, using geographical data towards the solution of problems in its own field; and some even consider this not merely a function of true Geography, but its principal function now and for the future. Their " New Geography " is and is to be the study of " human response to land-forms." This is an extreme American statement; but the same idea is instinct in such utterances, more sober and guarded, as that of a great geographer, Dr. H. R. Mill, to the effect that the *ultimate* problem of Geography is " the demonstrative and quantitative proof of the control exercised by the Earth's crust on the mental processes of its inhabitants." Dr. Mill is too profound a man of science not to guard himself, by that saving word " ultimate," from such retorts as Professor Ellsworth Huntington, of Yale, has offered to the extreme American statement. If, the latter argued, geography is actually the study of the human response to land-forms, then, as a science it is in its infancy, or, rather, it has returned to a second childhood; for it has hardly begun to collect exact data to this particular end, or to treat them statistically, or to apply to them the methods of isolation that exact science demands. In this country geographers are less inclined to interpret " New Geography " on such revolutionary lines; but one suspects a tendency towards the American view in both their principles and their practice—in their choice of lines of inquiry or research and their choice of subjects for education. The concentration on Man, which characterises geographical teaching in the University of London, and the almost exclusive attention paid to Economic Geography in the geographical curricula of some other British Universities make in that direction. In educational practice, this bias does good, rather than harm, if the geographer bears in mind that Geography proper has only one function to perform in regard to Man—namely, to investigate, to account for, and state his distribution over terrestrial space—and that this function cannot be performed to any good purpose except upon a basis of Physical Geography—that is, on knowledge of the disposition and relation of the Earth's physical features, so far as ascertained to date. To deal with the effect of Man's distribution on his mental processes or political and economic action is to deal with him geographically indeed, but by applications of Geography to Psychology, to History, to Sociology, to Ethnology, to Economics, for the ends of these sciences; though the interests of Geography may be, and often are, well served in the process by reflection of light on its own problems of distribution. If in instruction, as distinct from research, the geographer, realising that, when he introduces these subjects to his pupils, he will be teaching them not Geography, but another science with the help of Geography, insists on their having been grounded previously or elsewhere in what he is to apply—namely, the facts of physical Distribution—all will be well. The application will be a sound step forward in education, more potent perhaps for training general intelligence than the teaching of pure Geography at the earlier stage, because making a wider and more compelling appeal to imaginative interest and pointing the adolescent mind to a more complicated field of thought. But if Geography is applied to instruction in other sciences without the recipients having learned what it is in itself, then all will be wrong. The teacher will talk a language not understood, and the value of what he is applying cannot be appreciated by the pupils.

If I leave this argument there for the moment, it is with the intention of returning to it before I end to-day. It goes to the root, as it seems to me, of the unsatisfactory nature of much geographical instruction given at present in our islands. The actual policy of the English Board of Education seems to contemplate that Geography should be taught to secondary students only in connection with History. If this policy were realised in instructional practice by encouragement or compulsion of secondary students to undergo courses of Geography proper, with a view to promotion subsequently to classes in Historical Geography (*i.e.*, if History be treated geographically by application of another science previously studied), it would be sound. But I gather from Sir Halford Mackinder's recent report that such is not the practice. Courses in Geography proper are not encouraged during the secondary period of education at all. Encouragement ceases with the primary period, at an age before which only the most elementary instruction in such a science can be assimilated—when, indeed, not much more can be expected of pupils than the memorising of those summary diagrammatic expressions of geographical results, which are maps. How these results have been arrived at, what sort of causes account for physical Distribution, how multifarious are its facts and features which maps cannot express even on the minutest scale—these things must be instilled into minds more robust than those of children under fourteen; and until some adequate idea of them has been imbibed it is little use to teach History geographically. So, at least, this matter seems to me.

It will be patent enough by now that I am maintaining Geography proper to be the study of the spatial Distribution of all physical features on the surface of this Earth. My view is, of course, neither novel nor rare. Almost all who of late years have discussed the scope of Geography have agreed that Distribution is of its essence. Among the most recent exponents of that view have been two Directors of the Oxford School, Sir Halford Mackinder and Professor Herbertson. When, however, I add that the study of Distribution, rightly understood, is the whole essential function of Geography, I part company from the theory of some of my predecessors and contemporaries, and the practice of more. But our divergence will be found to be not serious; for not only do I mean a great deal by the study of Distribution—quite enough for the function of any one science!—but I claim for Geography to the exclusion of any other science all study of spatial Distribution on the Earth's surface. This study has been its well recognised function ever since a science of that name has come to be restricted to the features of the terrestrial surface—that is, ever since "Geography" in the eighteenth century had to abandon to its child Geology the study of what lies below that surface even as earlier it had abandoned the study of the firmament to an elder child, Astronomy. Though Geography has borne other children since, who have grown to independent scientific life, none of these has robbed her of that one immemorial function. On the contrary, they call upon her to exercise it still on their behalf.

Let no one suppose that I mean by this study and this function merely what Professor Herbertson so indignantly repudiated for an adequate content of his Science—Physiography *plus* descriptive Topography. Geography includes these things, of course, but she embraces also all investigation both of the actual Distribution of the Earth's superficial features and of the causes of the Distribution, the last a profound and intricate subject towards the solution of which she has to summon assistance from many other sciences and studies. She includes, further, in her field, for the accurate statement of actual Distribution, all the processes of Survey—a highly specialised function to the due performance of which other sciences again lend indispensable aid; and, also, for the diagrammatic presentation of synthetised results for practical use, the equally highly specialised processes of Cartography. That seems to me an ample field, with more than sufficient variety of expert functions, for any one Science. And I have not taken into account either the part Geography has to play in aiding other sciences, as they aid her, by application of her data, or, again, certain investigations of terrestrial phenomena, at present incumbent upon her, because special sciences to deal with them have not yet been developed—or, at least fully developed—although their ultimate growth to independence can be foreseen or has already gone far. Such, for the moment, are Geodetic investigations, in this country at any rate. In Germany, I understand, Geodesy has attained already the status of a distinct specialism. Here the child has hardly separate existence. But beyond a doubt it will depart from its parent, even as Oceanography has parted. Indeed some day, in a future far too distant to be foreseen now, many, or most, of the investigations which now occupy the chief attention of geographical researchers may cease to be necessary. A time must come when the actual distribution of all phenomena on the Earth's surface will have been ascertained, and all the relief upon it and every superficial feature which Cartography can possibly express in its diagrammatic way will have been set out finally on the map. That moment, however, will not be the end of Geography as a science, for there will still remain the investigation of the causes of Distribution, the scientific statement of its facts, and the application of these to other sciences. Let us not, however, worry about any ultimate restriction of the functions of our Science. The discovery and correlation of all the facts of geographical Distribution and their final presentation in diagrammatic forms are not much more imminent than the exhaustion of the material of any other science!

In the meantime, for a wholly indeterminate interval, let us see to it that all means of investigating the phenomena of spatial Distribution on the Earth be promoted, without discouragement of this or that tentative means as unscientific. The exploration of the terrestrial surface should be appreciated as a process of many necessary stages graduated from ignorance up to perfect knowledge. It is to the credit of the Royal Geographical Society that it has always encouraged tentative, and, if you like, unscientific efforts of exploration, especially in parts of the world where, if every prospect pleases, Man is very vile. Unscientific explorations are often the only possible means to the beginning of knowledge. Where an ordinary compass cannot be used except at instant risk of death it is worth while to push in a succession of explorers unequipped with any scientific knowledge or apparatus at all, not merely to gain what few geographical data untrained eyes may see and uneducated memories retain, but to open a road on which ultimately a scientific explorer may hope to pass and work, because the local population has grown, by intercourse with his unscientific precursors, less hostile and more indifferent to his prying activities. There seems to me now and then to be too much criticism of Columbus. If he thought America was India he had none the less found America.

I have claimed for the geographer's proper field the study of the causation of Distribution. I am aware that this claim has been, and is, denied to Geography by some students of the sciences which he necessarily calls to his help. But if a Science is to be denied access to the fields of other sciences except it take service under them, what science shall be saved? I admit, however, that some disputes can hardly be avoided, where respective boundaries are not yet well delimited. Better delimitation is called for in the interest of Geography, because lack of definition, causing doubts and questions about her scope, confuses the distinction between the Science and its Application. The doubts are not really symptoms of anything wrong with Geography, but, since they may suggest to the popular mind that in fact something is wrong, they can be causes of disease. Their constant genesis is to be found in the history of a Science, whose scope has not always been the same, but has contracted during the course of ages in certain directions while expanding in others. If, in the third century B.C. Eratosthenes had been asked what he meant by Geography, he would have replied, the science of all the physical environment of Man whether above, upon, or below the surface of the Earth, as well as of Man himself as a physical entity. He would have claimed for its field what lies between the farthest star and the heart of our globe, and the nature and relation of everything composing the universe. Geography, in fact, was then not only the whole of Natural Science, as we understand the term, but also everything to which another term, Ethnology, might now be stretched at its very widest.

Look forward now across two thousand years to the end of the eighteenth century A.D. Geography has long become a Mother. She has conceived and borne Astronomy, Chemistry, Botany, Zoology, and many more children, of whom about the youngest is Geology. They have all existences separate from hers and stand on their own feet, but they preserve a filial connection with her and depend still on their Mother Science for a certain common service, while taking off her hands other services she once performed. Restricting the scope of her activities, they have set her free to develop new ones. In doing this she will conceive again and again and bear yet other children during the century to follow—Meteorology, Climatology, Oceanography, Ethnology, Anthropology, and more. Again, and still more narrowly, this new brood will limit the Mother's scope; but ever and ever fecund, she will find fresh activities in the vast field of Earth knowledge, and once and again conceive anew. The latest child that she has borne and seen stand erect is, as I have said, Geodesy; and she has not done with conceiving.

Ever losing sections of her original field and functions, ever adding new sections to them, Geography can hardly help suggesting doubts to others and even to herself. There must always be a certain indefiniteness about a field on whose edges fresh specialisms are for ever developing towards a point at which they will break away to grow alone into new sciences. The Mother holds on awhile to the child, sharing its activities, loth to let go, perhaps even a little jealous of its growing independence. It has not been easy to say at any given moment where Geography's functions have ended and those of, say, Geology or Ethnology have begun. Moreover, it is inevitably asked about this fissiparous science from which function after function has detached itself to lead life apart—what, if the process continues, as it shows every sign of doing, will be left to Geography later or sooner Will it not be split up among divers specialisms, and become in time a venerable memory? It is a natural, perhaps a necessary question. But what is wholly unnecessary is that any answer should be returned which implies a doubt that Geography has a field of research and study essentially hers yesterday, to-day, and to-morrow; still less which implies any suspicion that, because of her constant parturition of specialisms Geography is, or is likely in any future that can be foreseen, to be moribund.

Since Geography, as I understand it, is a necessary factor in the study of all sciences, and must be applied to all if their students are to apprehend rightly the distribution of their own material, it is a necessary element in all education. Unless, on the one hand, its proper study be supported by such means as the State, the Universities, and the great scientific Societies control, and, on the other, its application to the instruction of youth be encouraged by the same bodies, the general scientific standard in these islands will suffer; our system of education will lack an instrument of the highest utility for both the inculcation of indispensable knowledge and the training of adolescent intelligence; and a vicious circle will be set up, trained teachers being lacking in quantity and quality to train pupils to a high enough standard to produce out of their number sufficient trained teachers to carry on the torch.

The present policy of the English Board of Education, as expressed in its practice, encourages a four-years' break in the geographical training of the young, the break occurring between the ages of fourteen and eighteen, the best years of adolescent receptivity. If students are to be strangers to specifically geographical instruction during all that period, any geographical bent given to their minds before the age of fourteen is more than likely to have disappeared by the time they come to eighteen years. The habit of thinking geographically—that is, of considering group distribution—cannot have been formed; and the students, not having learned the real nature of the science applied, will not possess the groundwork necessary for the apprehension of the higher applications of Geography. Moreover, as Sir Halford

Mackinder has rightly argued, an inevitable consequence of this policy is that the chief prizes and awards offered at the end of school-time are not to be gained by proficiency in Geography. Therefore, few students are likely to enter the University with direct encouragement to resume a subject dropped long before, at the end of the primary period of their education.

It is not, of course, the business of schools, primary and secondary, to train specialists. Therefore one does not ask that pure geographical science should have more than a small share of the compulsory curriculum. Only, that it have some share. If this is assured, then its applications, which on account of their highly educative influence deserve an equally compulsory but larger place in the curriculum, can be used to full advantage. The meaning and value of the geographical ingredient in mixed studies will stand good chance of being understood, and of exciting the lively interest of young students. In any case, only so will the Universities be likely to receive year by year students sufficiently grounded to make good use of higher geographical courses, and well enough disposed to Geography to pursue it as a higher study, and become in their turn competent teachers.

The obligation upon the Universities is the same in kind, but qualitatively greater. They have to provide not only the highest teaching, both in the pure science and its applications, but also such encouragements as will induce students of capacity to devote their period of residence to this subject. The first part of this obligatory provision has been recognised and met in varying degrees by nearly all British Universities during the past quarter of a century. A valuable report compiled recently by that veteran champion, Sir John Keltie, shows that, in regard to Geography, endowment of professorial chairs, allocations of stipends to Readers, Lecturers, and Tutors, supply of apparatus for research and instruction and organisation of "Honour" examinations, have made remarkable progress in our University world as a whole. But no single British University has yet provided all that is requisite or desired. Oxford and Cambridge, which have well-equipped geographical laboratories, still lack professorial chairs. Liverpool, maintaining a well-staffed Department of Geography, and London, which, between University College and the School of Economics, provides all the staff and apparatus required for teaching, have endowed Chairs; but they direct the attention of the holders to applications of Geography rather than to the pure Science. So do also the University of Manchester and the University College of Wales, both of which maintain geographical Professors.*

All the Universities, with but one or two exceptions, examine in the subject to a high standard, that set by Cambridge being perhaps the highest over the whole field of properly geographical study. This latter University, also, alone (if I am not mistaken), has met the second part of her obligation to Geography by the organisation of an Honours course of instruction and classified examination, which, if pursued throughout a student's residence, is sufficient in itself to secure graduation. At Cambridge, therefore, Geography may be said to stand on a par with any other self-contained Final Subject. Neither in London nor in Manchester (I am not quite sure about Liverpool, but believe its case to be the same) is Geography, in and by itself, all sufficient yet to secure graduation, though at each of these Universities it counts strongly in the Baccalaureate Honours course. Oxford offers distinctly less encouragement at present than any of the Universities just mentioned. Her teaching and her examination standard are as advanced as the best of theirs, and the highest award which she gives for proficiency in Geography, her Diploma "with distinction" counts towards the B.A. degree in at least as great a proportion as at any other University except Cambridge—it counts, in fact, as two-thirds of the whole qualification; but—here's the rub!—the balance has to be made up by proficiency in some other subject up to a pass, not an Honours standard. Therefore the resultant degree does not stand before the world as one taken in Honours; and, although some candidates are notified as distinguished and some not in the geographical part of her examinations, the distinction is not advertised in the form to which the public is accustomed—namely, an Honours list divided into classes. The net result is that an Oxford diploma, however brilliantly won, commands less recognition in the labour market than would a class in an Honour School or Tripos. It should, however, be mentioned—though an infrequent occurrence, not advertised by a class list, makes little impression on public opinion—that special geographical research, embodied in a thesis, can qualify at Oxford for higher degrees than the B.A.—viz., for the B.Litt. and B.Sc.—without the support of other subjects.

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* [The reference to Manchester is incorrect in two particulars. The courses of study in the Honours School instituted in 1923 are devoted almost entirely to pure geographical science on a regional basis. The University does not yet maintain a geographical Professor.—Ed.]

The reason for this equivocal status of Geography at Oxford is simply that, so far as the actual Faculties which control the courses for ordinary graduation are concerned, Geography is, in fact, an equivocal subject. No one Faculty feels that it can deal with the whole of it. The Arts Faculties will not accept responsibility for the elements of Natural and Mathematical Science which enter into its study and teaching—for example, into the investigation of the causes of Distribution, into the processes of Surveying, into Cartography, and into many other of its functions. Moreover, the traditional Oxford requirement of a literary basis for Arts studies is hard, if not impossible, to satisfy in Geography. The Faculty of Natural Science, on the other hand, is equally loth to be responsible for a subject which admits so much of the Arts element, especially into those applications of its data which enter most often into the instructional curriculum of adolescents—for example, its applications to History and to Ethnology.

At this moment, then, there is an *impasse* at Oxford similar to that (it is caused by the same reason) which prevents the election of a Geographer, as such, either to the Royal Society on the one hand, or to the British Academy on the other. But ways out can be found if there be goodwill towards Geography, and such general recognition of the necessity of bringing it into closer relation with the established studies, as was implied by the examiners in the Oxford School of Literae Humaniores last year, when, in an official notice, they expressed their sense of a lack of it in the historical work with which they had to deal. Faculties are comparatively modern organisations at Oxford as at Cambridge for the control of teaching and examining. Before them existed Boards of Studies, appropriated to narrower subjects; and, indeed, such Boards have been constituted since Faculties became the rule and side by side with them. The Board, which at the first controlled at Oxford the Final Honour School of English, is an example and a valid precedent Cambridge has found it possible to organise a mixed Board of Studies to manage a Final School of Geography, the Board being composed of representatives of both the Arts subjects and the Natural and Mathematical Sciences; and this acts apparently to the general satisfaction even in the absence of a Professor of the special subject, for whose teaching and testing it was formed. Why, then, should Oxford not do likewise? If Cambridge has not waited for the endowment of a Professorial Chair in Geography, need Oxford wait? I am well aware that, when at the latter University the School of English came into existence, there were already two Chairs appropriated to its subject; and I grant that Oxford will not have the very best of all guarantees that a high standard will be maintained in the instructional courses and the examinations in Geography, until there is a Professor *ad hoc*. But guarantees sufficient for all practical purposes she could obtain to-morrow by composing a Board out of her existing teachers of Geography and kindred sciences.

For the last time, then, let me rehearse the too familiar "vicious circle." The supply of good students depends on a supply of good teachers; the supply of good teachers depends on a supply of good students. If either supply fails, it is not Geography alone, but all sciences and studies that will be damnified; for all require the best of the help she can give in proportion as her science grows and improves. History will be able to call but indifferent Geography to her assistance, if this science has been understaffed and discouraged by official reluctance to allow it a place of its own in the sun. Is there not still some such reluctance on the part of the Board of Education, of some of our Universities, and of the Civil Service Commissioners?

# MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, EDINBURGH,

## SEPTEMBER 7th to 14th, 1921.

(Report of the Delegate, T. W. SOWERBUTTS.)

EDINBURGH, with its Geographical associations, Historical reminiscences, Architectural attractions and natural beauty made an ideal setting for a most pleasant and profitable meeting of the Association, at which there was a quite satisfactory attendance.

The Handbook prepared by the local editorial committee is a description of "Edinburgh's Place in Scientific Progress," and the twenty-five papers, by recognised authorities on the various subjects give in a wonderfully condensed form a very complete record of the activities of the ancient city, and are illustrated by portraits of some of her leading men.

The Inaugural Meeting was held in the Usher Hall on Wednesday evening when, in the absence through illness of the President, Sir T. Edward Thorpe, C.B., F.R.S., his address on the past half-century's progress in Science, was read by one of the Vice-Presidents, Sir J. A. Ewing, K.C.B., F.R.S., &c., Vice-Chancellor of the University.

On Thursday evening the Civic Reception took place in the Royal Scottish Museum; on Friday Prof. C. E. Inglis gave a "Comparison of the Forth and Quebec Bridges," showing the evolution of cantilever bridge construction during the past thirty years, while on the following Tuesday evening Prof. W. A. Herdman, C.B.E., F.R.S. (the retiring President) delivered a most interesting address on Edinburgh and Oceanography.

The General Committee had under consideration the Report of the Council.

The items of special geographical interest in the report were :—

(*a*) The need for a central British institute for training and research in surveying, hydrography, and geodesy has been brought to the notice of the Royal Commissions on the Universities of Oxford and Cambridge. (Resolutions of Sections A and E.)

(*b*) Resolutions from Sections E and A in favour of the collection of rural lore through the agency of schools and colleges were approved and forwarded to the President of the Board of Education and to the Scottish Education Department.

(*c*) A resolution from Section E on geographical education in advanced courses, was approved and forwarded to the President of the Board of Education.

(*d*) The Council forwarded to the Royal Society a resolution from Section E, asking that the representation of the Association on the National Committee on Geographical Research should be one who might hold office for a longer term than the President of Section E during his year of office (as proposed by the Society). Having ascertained the concurrence of the Society with this view, the Council appointed Professor J. L. Myres to represent the Association.

The proceedings of Section E (Geography) included the Presidential Address by Dr. D. S. Hogarth, C.M.G., on "Applied Geography," which, by his kind permission, is reprinted in this issue. (See page 61.)

Papers on Maps were submitted by Lieut.-Col. E. F. W. Lees, D.S.O., "Aeronautical Maps"; Messrs. H. R. G. Inglis and W. Cowan, "Primitive Maps of Great Britain and Early Plans of Edinburgh," illustrated by collection lent by the Royal Scottish Geographical Society; Lieut.-Col. H. S. Winterbotham, C.M.G., D.S.O., "The Present Position of the International 1 : 1,000,000 Map."

Miss A. M. B. Gillett read an interesting paper on "The Historical Geography of the Black Earth Region of Central Russia."

Capt. L. V. S. Blacker described in "Fresh Ground in Turkestan and Khorasan 1918—1920," how he went over the Pamirs to Turkestan in 1918, made a winter journey southward over the Pamir, from Chinese Pamir to Yarkand, and from Baluchistan to Mero, visited the forbidden fortress of Kelat-i-Nadiri, through unexplored country north-east of the Kara Dagh, and how it was mapped and spent nine months in the Kurd Country of the South-East Caspian region.

Dr. Newbigin discoursed on "The Mediterranean City State in Dalmatia," tracing its origin and growth to recent times, and the problem it presents for the future.

A joint discussion with Section H was on "The Origin of the Scottish People," and another on "The Teaching of Geography" (with Section L), opened by Mr. G. G. Chisholm, which led to a lively interchange of views in which Sir Richard A. Gregory, Mr. T. S. Muir, Prof. J. W. Gregory, F.R.S., Dr. Rudmose Brown, Mr. W. H. Barker, Mr. H. O. Beckit and Professor L. W. Lyde, M.A., took part.

At the Sectional Committee Meeting it was

Resolved to draw the attention of the Council to the Revised Regulations for Secondary Schools, England, 1921, so far as they concern instruction in Geography, and to ask the Council to take the necessary steps to ascertain :

(1) Whether the effect of the new Regulations is to insure the continuity of instruction in Geography up to the age of 16 (as appears to be provided in Sections 6 and 7, p. 7).

(2) Whether it is the intention of the Board that the phrase "Language, Literature, and History" in Section 48 (*a*), B. C. D., in the absence of specific reference to the Geography of selected countries should be construed as necessarily including adequate Geographical study of the selected region.

(3) Whether the Board accepts Geography as a "main subject of study" under Sub-Section A, Science and Mathematics.

Resolved that a joint Committee of Sections E and L be appointed to formulate suggestions for the teaching of Geography both to Matriculation standard and in advanced courses, to report upon the present position for the geographical training of teachers, and to make recommendations thereon, and to report as occasion arises to the Council, through the organising Committee of Section E, upon the practical working of the regulations issued by the Board of Education, affecting the position of Geography in Training Colleges and Secondary Schools.

The Conference of Delegates met Thursday and Tuesday afternoons.

Sir Richard Gregory took for the subject of his Presidential Address "The Message of Science," which was followed by a discussion on "Science and Citizenship," and at the second meeting Professor Geddes opened a discussion on "Regional Surveys" in which Mr. Harold Peake, Mrs. Fraser Davies, Prof. H. J. Fleure and others took part, when the following resolution was passed :—

> "That this meeting of Delegates of the Corresponding Societies of the British Association approved the movement for regional survey, of which examples have been exhibited and explained; and towards the promotion and initiation of such surveys they invite a further exhibition at next year's meeting (at Hull) with discussion towards methods of presentment, etc.
>
> It also desires to aid co-operation among Scientific Societies, educational institutions, public libraries, museums, etc., with civic societies and municipalities, or otherwise, towards the preparation of surveys, and their due preservation and exhibition, for educational, general, and municipal purposes."

# ATLANTIS AND THE ANCIENTS.

By Kate Qualtrough, F.R.G.S.

(Delivered to the Society, March 28th, 1922.)

Being impressed by the remarkable resemblances between the ancient civilisations found upon the opposite shores of the Atlantic Ocean, it occurred to me to endeavour to elucidate the source from which they must have radiated—hence this paper.

The history of man is like the history of the earth on which he dwells. It has its times of sunshine and of storm; its great floods and ebbs; its volcanic outbursts, as well as its imperceptible secular changes. Nations are born and grow old like men; and as in geological so in historical progress, the earliest ages are the longest and least complex in development.

Vast geological operations are still in progress; continents are slowly subsiding at the rate of a few inches in a century, while new lands are uprising out of the water, extensive deltas are in process of formation by alluvial deposition. But these changes, vast as to their aggregate amount, are so gradual that generations pass away without having note of any sensible mutations. It is true that local names form an abiding chronicle, and often enable posterity to detect the progress of these physical changes. Occasionally they even assign a precise date in the period of their operations.

But language—the pedigree of nations, is not silent, old chronicles and traditions confront us, with impressive evidence of loss by the action of the sea on our own coasts, and Plato, the Greek scholar and historian, has preserved to posterity the history of Atlantis.

He asserts that there once existed in the Atlantic Ocean, opposite the mouth of the Mediterranean Sea, a large island, the remnant of an Atlantic Continent (the ocean being navigable at that time) and known to the world as Atlantis. It was situated in front of the Strait called Hercules, and was larger than Libya and Asia (meaning Asia Minor) joined together. It was the way to other islands, and from them one might pass through the whole of the opposite continent which surrounded the ocean.

For the sea which is within the Straits of Hercules is only a harbour, having a narrow entrance, but that other is a real sea, and the surrounding land may be most truly called a continent.

Now in the Island of Atlantis, there was a great and wonderful empire which ruled over that and several others, as well as over parts of the continent. They subjected also the parts of Libya within the Pillars of Hercules as far as Egypt and of Europe as far as Tyrhenia.

This vast power, gathered into one, endeavoured to subdue, at one blow, Egypt and Greece (our country and yours) and the whole of the island that was within the Straits, but was defeated by the Hellenes.

Afterwards there occurred violent earthquakes and floods. Later, in a single day and night, the island of Atlantis disappeared, being sunk beneath the sea.

That is the reason why the sea, in those parts, is now impassable, because there is such a quantity of mud caused by that subsidence.

Plato's statement is verified by the testimony of the sea, for recent investigations made by the deep sea soundings of the United States ship "Dolphin," and the British ships "Hydra," "Porcupine," and "Challenger." The mapping of the sea bed of the Atlantic Ocean reveals the existence of a great elevation, reaching from a point in the British Isles (Cornwall, the Scilly Isles, Channel Isles, Ireland and Brittany) southwardly to the coast of South America, at Cape Orange, thence south-east to the coast of Africa, from there southwardly to Tristan D'Acunha. It rises about nine thousand feet above the great Atlantic depths surrounding it, and in the Azores, St. Paul's Rocks, Ascension and D'Acunha it reaches the surface of the ocean.

Evidence that this elevation was once dry land is found in the inequalities; the mountains and valleys of its surface could never have been produced in accordance with any laws for the deposition of sediment nor by submarine elevation, but only by agencies acting above the water.

When these connecting ridges extended from America to Europe and Africa they prevented the flow of the tropical waters of the ocean to the north.

The Gulf Stream was then not in existence; the land-locked ocean that washed the shores of Northern Europe was thus intensely cold, the result being the Glacial Period. When the barriers of the continent of Atlantis sunk sufficiently to permit the natural expansion of those waters to the north the ice and snow which covered Europe disappeared gradually. The Gulf Stream flowed around Atlantis, retaining still the circular motion first imparted to it by the presence of that island.

The officers of the "Challenger" found the entire ridge of Atlantis covered with volcanic deposits. These are the subsided mud which, as Plato affirms, rendered the sea impassable after the destruction of the island.

It does not follow that at the time Atlantis was finally engulfed. The ridges connecting it with America and Africa rose above the water level. These may have gradually subsided into the sea or have gone down in cataclysms. The Atlantis of Plato may have been confined to the Dolphin Ridge.

Europe and America was constructed from the washings of this ancient continent. The deepest parts of the ocean bed, 3,500 fathoms represent the portion submerged first; the plains to the east and west of the central mountain chain. Some of the loftiest peaks of the range, the Azores, St. Paul's, Ascension Island and Tristan D'Acunha, are still above the ocean level. These connecting ridges are the pathways which once extended between the Old World and the New, by means of which the plants and animals of one continent travelled to the other. The fauna and flora exhibit a marked resemblance —their identity cannot be questioned, for all, or nearly all, belong to the same genera, while many of the species are common to both continents.

The hairy mammoth, woolly-haired rhinoceros, the Irish elk, the musk ox, the reindeer, the glutton, leeming, more or less accompanied this flora. Their remains are always found in the post-glacial deposits of Europe as far as the south of France. In America beds of the same age contain similar remains, an indication that they came from a common centre (Atlantis) and thus radiated to both continents alike.

The fossil remains of the camel are found in India, Africa, South America and in Kansas; the existing alpacas and llamas of South America being only varieties of that family.

The cave bear, whose remains are found associated with the bones of the mammoth in the caves of Europe, was identical with the grisly bear in the Rocky Mountains. The glutton of Northern Europe in the Stone Age is identical with the wolverine of the United States; the ancient bison with the existing American buffalo, the northern elk with the American moose.

A comparison of the flora proves that not only was there communication by land, but that mankind must have existed and have helped the transmigration of plants which were incapable of making the journey unaided.

The fossil beds of Switzerland in the Miocene Age reveal the remains of more than eight hundred different species of flower-bearing plants, the majority of which have migrated to America, as well as others that passed into Asia, Africa and even Australia. The types of America are, however, in the largest proportion, and the flora of the Miocene Age now flourishes in the forests of Virginia, North and South Carolina, the magnolias, tulip trees, evergreens, oaks, in addition to the principal tropical domesticated plants. the tomato, bamboo, guano, mango fruit and banana.

The cultivation of the cotton plants and the manufacture of the product were known alike to the ancients of the Old and New Worlds. Herodotus describes it, in 450 B.C., as the tree of India that bears a fleece more beautiful than that of the sheep. Columbus found the natives of the West Indies weaving cotton cloths, as did the ancients of Mexico and Peru. The plant has been found growing wild in many parts of America, but never in the Old World, indicating that it was a native of America, the confirmation being the superiority of that cotton, as plants transmited from America to India degenerate, while those from India to America improve.

It may be affirmed that the plants and animals may have passed from Asia to America across the Pacific Ocean by the continent of Semuria, or there may have been continuous land communication at one time at Behring's Strait. An examination, however, of the flora of the Pacific States shows that a great number of the trees and plants common to Europe and the Atlantic States are not found west of the Rocky Mounains.

The magnolia and Tulip trees of the Miocene Age in Switzerland and at present in the United States are non-existent in the Pacific States. They possess no papaw, linden, nor locust or cherry trees large enough for timber trees. These facts prove that the forest flora of North America entered from the east, and that the Pacific States possess only those fragments of it that were able to struggle over or around the great dividing chain.

Atlantis was a great island adjacent to smaller ones, forming stepping stones towards Europe and Africa in one direction, and the West Indies and America in the other.

With regard to its physical features, the whole country was lofty and precipitous on the side of the sea, but surrounding the capital was a level plain, which was encircled by mountains descending to the sea. These were celebrated for their number, size and beauty. Volcanic mountains were on the main islands rising to a great height, their summits being crowned with perpetual snow. Below these were elevated table lands, upon which were built the royal establishments. Below these again were the great plains. Four rivers flowed N.S.E.W. from a central point.

The climate resembled that of the Azores, mild and pleasant. The soil volcanic and fertile, suitable at its different elevation for the growth of the productions of the tropical and temperate forests. The people were great, rich, refined and educated. They represented two different races—a dark brown reddish race, akin to the Central Americans, and a white race, like the Celts, Greeks and Scandinavians. They must have had intercourse with Europe, the Mississippi Valley, Africa, Egypt and Peru, for their ancient civilisations are parallel. Therefore must not that civilisation have been derived from a centre and radiated in all directions?

The Pyramids of Egypt, Assyria and Phœnicia had their affinities in Mexico, Central America and Peru. All were erected with their sides square to the four cardinal points, the walls receding inwardly, the doors narrower at the top than at the threshold in Egypt and Peru. Pyramids are found everywhere in Mexico, the most ancient being at Teotihuacan, eight leagues from the city of Mexico. The two largest were dedicated to the sun and moon respectively, each built of cut stone with a level area at the summit and four stages leading up to it. That of the moon has a base covering 426 feet and a height of 137 feet. The Pyramid of Cholula, measured by Humboldt, is one of the greatest constructions ever made by human hands, even now, in its ruined condition, 160 feet high, 1,400 feet square at the base, covering 45 acres. The greatest Pyramid of Egypt, Cheops, covers only twelve or thirteen acres. There is a striking similarity—the site chosen is the same, the structures are oriented with slight variations, the line through the centre (of them) is the astronomical meridian.

The river Nile has a valley of the dead, as in Teotihuacan there is a street of the dead, where the devout of the Anhua were laid, in the sure hope that if thus interred they would find entrance into the Paradise of the Sun. The arrangements of the interior are analogous, and in both Egyptian and American Pyramids a thick coating of smooth shining cement embellished the exterior.

The Chaldean principle of erection of temples was adopted both East and West—upon the summit of the Pyramid. In Palenque and Chiapas, as well as in other places, temples are thus found, essentially Egyptian in design, not only as regards their plan, but also in the details of their decoration, from the winged disc in the lintel, to the reliefs within the sanctuary, even scenes being depicted strictly similar to those in the Theban temples.

Statues found at Palenque show a marked resemblance to those of Egypt. One was ten feet in height, of which two feet six inches were underground. The head-dress is lofty and spreading; there are holes instead of ears which were perhaps adorned with ear-rings of gold and pearls. Round the neck is a necklace, and pressed against the chest by the right hand is an instrument apparently with teeth. The left hand rests on a hieroglyphic, from which descends some symbolic ornament. The whole of the figure stands on a hieroglyphic analogous to the Egyptian custom of recording the name and position of the hero or other person represented.

Agriculture was the foundation of national prosperity in the world of the ancients in Atlantis and Egypt. Babylon and Peru, situated in the basin of alluvial rivers. In Egypt and Peru the king put his hand to the plough at an annual festival, thus dignifying and consecrating the occupation of husbandry.

The public works were similar, aqueducts (hewn stone and cement) being constructed with notable skill.

The Peruvian roads extended 450 miles across sierras and over rivers parallel with the mountains through the whole length of the empire from Quito to Chili. They were from 20 to 25 feet in width, macadamised with pulverised stone, mixed with lime and bituminous cement, cut for leagues through the rocks, rivers being crossed by suspension bridges

Caravansaries similar to those in the East were established for the benefit of travellers.

When it is realised that all these nations instituted castes, the occupation of the father descending to the son, as in India, and they had the same style of ornamentation, worked metals, dug canals, practised mummification and deformation of the skull, had an order of priesthood, nay more, all possessed the art of and materials for writing. In Egypt it was represented by the papyrus, in Mexico and Peru by the quipus, corresponding to the abacus, a cord about two feet long composed of different coloured threads tightly twisted together, from which a quantity of threads were suspended in the manner of a fringe. The threads were of different colours and tied into knots. The colours denoted visible objects, white representing silver and yellow gold but the quipus were, however, chiefly used for mathematical purposes, the knots serving instead of cycles. The enumeration was by tens, as in Babylon and Egypt—peace, red; war, green. A combination of knots usually referred to accounts. This method of recalling a thought is analogous to the wampun of the Indians of the North Atlantic coast, which was composed of pieces of wood strung together and worn as a belt; to the phylacteries of the early Hebrews, by which they preserved before their minds the words of the Law and to the rosaries of the Roman Catholics instituted by St. Dominic as a means of meditation.

Geography and astronomy were sciences of paramount importance to the ancients. Although it is many thousands of years ago since the men who wrote in Sanscrit lived in north-west India, yet to this day are preserved their ancient books, maps and descriptions of the western coast of Europe, even of England and Ireland, as well as a full knowledge of the sources of the Nile. The Babylonian maps showed the world divided into seven zones of climate. The Peruvians were acquainted with geography so far as it related to their own empire. They ornamented maps with lines raised on them to denote the boundaries and localities. Taventinsuya is the real name for the country, meaning four quarters, and into which the kingdom was divided, each distinguished by a separate title and joined to the capital by the four great roads. The cities were in like manner divided; the various races which gathered there lived in the quarter nearest to their respective province. The four cardinal points were distinguished on the maps by different colours, as in Egypt, north associated with red, south with blue, east with white, west with yellow.

The earliest picture writing of the Hittites denotes the physical features and occupations of the people, and the excavations made by the Pumpelly Expedition in Central Asia have resulted in the discovery of pottery of the Neolithic Ages prove that that region possessed rivers now extinct and a rainfall that must have maintained a numerous population. A great overland route existed in ancient times between the Black Sea and China. Heeren mentions a temple of the Sun and a great caravanseri in the desert of Gobi.

Arminius Vámbéry, in his travels in Central Asia, describes very important ruins near the eastern shore of the Caspian Sea at Gömüsh tepe. Connected with these are the remains of a great wall which he folowed for ten geographical miles, a vast aqueduct was also found 150 miles long, extending to the Persian mountains. He reports abundant ruins extending to China.

Plato asserts that the religion of Atlantis was pure and simple, no regular sacrifices being made, but fruits and flowers. The sun and moon were worshipped, as in Egypt, temples being erected to the Sun God Ra, in Peru to Ra Mi. The saying that

"East is East, and West is West,
And ne'er the twain shall meet"

may be true of modern times, but not of the age of the ancients; the chronological system of Persia and Mexico proving that there must have been a close connection between them.

As in Chaldea, the year was divided into 360 days, five complimentary days being added, as in Egypt, to make up the 365. The Aztecs relegated them to no month as they were regarded as unlucky. But as the year is composed of nearly six hours more than 365 days there were provided for by calculation, not every fourth year, but fifty-two years, when 13 days were interposed.

To harmonise the lunar with the solar years observations were made by means of certain upright stones similar to the stone circles of the Druids and like those found in Northern Europe and Asia. The shadows from these stone pillars formed a scale for measuring the exact times of the solstices.

The Equinoxes were determined by an erect stone, in shape like a truncated cone projecting above a table of solid rock from which the whole was cut. A line was drawn across the level platform from East to West and observations were taken as to when the shadow of the pillar became continuous on the line from sunrise to sunset. When the shadow was scarcely visible under the noontide rays it was said that the god sat with all his light upon the column. The period of the equinoxes was celebrated by important festivals.

It is very remarkable that the Mexican and Persian chronological system should be identical. The former threw their years into great cycles of fifty-two years each which they called sheafs or bundles, represented by a quantity of reeds bound together by a string.

The weapons of the ancient races of the two worlds were identically the same, whereas if they had been derived from separate sources of invention, one country or the other would have possessed implements not known to the other. Absolute identity in many weapons proves the identity of origin. Those of the Incas consisted of the usual ones employed by nations whether civilised or uncivilised before the invention of powder, bows and arrows, lances, darts, a short kind of sword, a battle axe, and slings with which they were very expert.

Their spears and arrows were tipped with copper, or more commonly with bone, the weapons of the Inca lords being tipped with gold or silver. The protections for the head of the higher orders consisted of casques of wood or skins of animals, often richly decorated with metal and precious stones, surmounted by the brilliant plumage of the tropical birds. The great mass of the soldiery were clothed in the peculiar costume of their provinces, their heads wreathed with a roll of different coloured cloths, the defensive armour a shield, and a close tunic of quilted cotton. Each company had its particular banner, and the imperial standard high above all, displayed the glittering device of the rainbow.

Like the Egyptians, Babylonians and Assyrians the Incas were continually at war. And the same device for securing the loyalty of conquered peoples was practised. When any portion of the recent conquests displayed a pertinaceous spirit of disaffection, it was not uncommon, both East and West, to cause a part of the population to remove to a distant quarter of the kingdom, occupied by ancient vassals of undoubted fidelity to the crown, a number of the latter being transplanted to the territory left vacant by the captives. By this exchange the population consisted of two distinct races who regarded each other with enmity, and served as a check on any mutinous proceedings.

In America as in Asia and Africa all the original civilisations were seated in hot countries, the whole of Peru being within the Southern Tropic, Mexico in the North. In all of them their social phenomena were subordinate to their physical laws. The characteristics of their national food were precisely those met with in the most flourishing parts of Asia and Africa.

Few of the nutritious vegetables belonging to the Old World were found in the New, their place was supplied by others exactly analogous, the rice and dates of the East by the maize and banana of the West. The soil produced the same abundance, the same facility of growth, the same exuberant returns, therefore followed by the same social results, the same despotic power on the part of the upper classes, and subservience on the part of the lower.

As in Egypt and India, so in Mexico and Peru, the arts and particularly those which minister to the luxury of the wealthy classes were cultivated with great success. Their houses were filled with ornaments and utensils of admirable workmanship; their chambers were hung with splendid tapestry, their dresses and personal decorations showed incredible expense, their jewels, their rich and flowing robes embroidered with the rarest feathers collected from the most distant parts of the Empire, all implying evidence of the possession of unlimited wealth and the prodigality with which it was wasted.

Immediately below this class came the people, who bore all the burden of taxation, the nobles and the clergy being exempt. It was impossible for the people to accumulate property, they were obliged to defray the cost of government by their own personal labour which was placed under the entire command of the State. Feelings of personal independence were obliterated by the framing of laws by which freedom of action was suppressed, the people could neither change their residence nor alter the style of their clothing without permission. To each man the law allotted his trade, apparel, his wife, nay even his amusements.

The maxim of Tupac Inca Yupanqui, one of the most renowned of Inca sovereigns: "Science was not intended for the people, but for those of generous blood, persons of low degree are only puffed up by it and rendered vain and arrogant. Neither should such meddle with the affairs of government, for this will only bring office into disrepute and cause detriment to the State," had its parallel in the Egyptian proverb, "That the back of man must bend." Two thousand men were occupied for three years in carrying a single stone from Elephantine to Sais, the making of the canal of the Red Sea cost the lives of 20,000 men, 360,000 men were occupied for twenty years in making one Pyramid, just as in Peru the creation of the Royal residence occupied 20,000 men for fifty years.

The prodigality with which the upper classes squandered away the lives of the workers is appalling, as they provided the sacrifices to obtain rain at the accession of a monarch, the dedication of a temple. The numbers stagger humanity even more so when it is realised that the practices extended from East to West and even among the later Greeks and Romans.

Thus the ancient civilisations on both sides of the Atlantic Ocean are similar and the same that Plato recorded of Atlantis, therefore they must have descended one from the other or have radiated from some common source—Atlantis.

The derivation of Atlantis and Atlantic Ocean present many interesting features. They are derived from the Atlas Mountains. But what is the derivation of Atlas? It is not Greek neither does it belong to any European tongue, but to the Nahua language (the predecessor of the Toltecs in Central America) the root Atl signifying water. From this comes Atlas, the border of or mixed with water, from which comes Atlantis.

A city named Atlan existed when the American continent was discovered by Columbus, at the entrance of the Gulf of Uraba in Darien, the present Acla. Opposite to the submerged Atlantis are the Atlas Mountains; in the north-west, Herodotus asserts that a people named Atlantes lived near them, represented to-day. The inhabitants of the present Barbary States were known to the Greeks, Romans and Carthaginians as Atlantes, especially so to Fezzan and Bilma.

It is remarkable that there should be an Atlas Mountain on the shore of Africa, an Atlan town on the opposite one of America, the Atlantes living on the north and west coasts, an

Aztec people from Aztlan in Central America, an Atlantic Ocean rolling between the two worlds as well as a mythological deity holding the world on its shoulders, and an immemorable tradition of the island of Atlantis.

It is not a coincidence but an overwhelming proof of the veracity of Plato's statement that there was a passage from Atlantis to the coast of Africa, which accounts for the representation of negroes on the monuments of South America at Chichen Itza. A number of idols have been exhumed at San Juan de Teotihuacan with remarkable negroid faces similar to the ancient Sumerian. As the negroes have never been a sea-going race, the presence of these among the antiquities of South America proves the existence of land between America and Africa, and commercial relations between the two. As if in confirmation all the monuments of ancient culture are concentrated on the west coast of Africa.

The history of all nations has been influenced by their rivers; the course of civilisation has usually followed, either upwards or downwards, the course of the stream. All the great rivers of America are on the eastern coast, neither in North or South America does one considerable river discharge its waters into the Pacific Ocean. Just as the science of geology proves the North and Irish Seas, so the bed of the Atlantic has been occupied by land connecting Scandinavia and the British Isles with America. The river flowing northward to the Atlantic Ocean had for its tributaries the St. Lawrence, Mississippi and the Niger. Plato asserts that Atlantis was watered by four rivers flowing N.S.E.W. from one central point. The Mississippi, Amazon, La Plata, Niger and Congo verify his statement. The people of Atlantis built cities, the capital answering to the description of ancient Thebes or the capital of Peru. Their ports and harbours were filled with ships and merchandise.

Ethnology proves the connection of Atlantis, either racially or commercially. The physiognomy of the Hittites is that of the Red Indians. The former were that great trading race whose monuments are found sporadically from the north of Asia Minor, Eyak to Hamath in the south, and from the Euphrates in the east to the coast of Ionia in the west. They were a widespread power, occupying a foremost place in history, being the Katto of the Egyptian monuments. Their hieroglyphic system of writing is the oldest in the world, and similar to that of Mexico and Peru, Egypt, and particularly the Mayas of Central America. The sandals on the feet of the Hittite God are identical with those upon the feet of the statues of Chaemol at Chichen Itza, as well as those found upon the mummies of the Guanches—the earliest inhabitants of the Canary Islands. Is this a mere coincidence?

Without the phonetic alphabet civilisation would have been an impossibility. The Mayas, the ancients of Yucatan, claim that theirs came to them across the sea in ships from the East, that is Atlantis. They succeeded the Colhuas, whose era terminated 1000 B.C., from whom they received the alphabet.

Viewing the alphabets of European nations, the Phœnician forms have shown a gradual modification, the Mayas otherwise because they are one of the most conservative peoples in the world.

The letter N is represented by a serpent in the Hittite, Egyptian and Central American hieroglyphics, likewise the letter K, the two lines projecting from the upright stroke are a survival of the convolution of the serpent in the Maya original and the Egyptian copy.

The exact form of the Mayan E has been found in the inscriptions of ancient Troy.

The letter O is a circle or dot within a dot, similarly repeated in the Phœnician and Egyptian. In the Runic it is a circle within a circle. In one form of the Greek a dot was placed at the side of it instead of below it.

The Mayan H is a tie of cord, in Egyptian a twisted one. Both representations of U are similar.

The ancient Egyptians, confined as they were to the River Nile Valley, abhorred the sea, yet their alphabet and literature are similar. "May the Creator, the Sun and the Thunder ever remain young and never become old." The Prayer: "May thy Son, the Inca, always retain his youth, and grant that he may prosper in all he undertakes. And to us, thy sons and descendants, who now celebrate this festival, grant that we may be ever in the hands of the Creator of the Sun, of the thunder and in thy hands," shows a marked resemblance to the Egyptian and Semitic supplications. But the American and Asiatic languages are one, so is their mythology. The Babylonian Fish God is represented as coming from the East (Hue Hue Tapalan Quatalcoatl) to Tula and becoming the patron god of the Mayas who describe him as a white man with strong formation of body, broad forehead and large eyes. This is remarkable, for how could the beardless Americans have imagined a bearded man? He was skilled in many arts, inventing gem and metal cutting, originating letters and the American Calendar. On the columns at Chichen Itza may be seen the carved figures of long bearded men with upraised eyes in the act of worshipping trees—the religion of the matriarchal ages—when agriculture was first systematically practised in Southern India—the age of the Fish God and Arabian Nights, when the ancestors of the Hittites established commerce between the Indian Ocean and the West. The Amazon was then an open sea, so Peru was reached as well as the borders of the Great Lakes, for just as the alluvial valleys of the Euphrates and Tigris attracted settlers so did those of the Mississippi. This is the universal empire to which Plato alludes, confirmed by Hindoo writings, Deva Mahuska was ruler. From one end of it to the other is found tree worship—the Indian village system—artificial deformation of the skull, embalming of the body, terrace cultivation, the symbol of the cross. The Mayas was dedicated to the rain god Quia Teot, children of both sexes being sacrificed in order to procure rain. The cross at Palenque, with the image of the sacred bird perched on it, is a reminder of the Gond legend of the Bindo Bird that brings the rain.

The Palm Tree of Babylonia has its counterpart in the Coca tree of Peru. It was regarded as a symbol of divinity, and originally its use was confined exclusively to the royal family. The sovereign could show no higher mark of esteem than to bestow a gift of this precious leaf upon those whom he wished to endow with a special mark of his favour. Golden duplicates of the Coca shrub and its leaf have been found in the gardens of the Temple of the Sun at Cusco, proving that it was sacrificed to their idols.

The importance of geographical knowledge with regard to history cannot be overestimated. But where history is silent those sermons in stones, the Cromlechs, fill up the gap. The term Druid's Circle is often applied erroneously to them. They are the work of the Bronze Age, which was preceded by an age when copper and tin were used separately, before the ancient metallurgists had discovered the art of combining them. No such age existed in Europe, therefore the art of making bronze was introduced in, not invented in, Europe. The traces of a long enduring copper age are found only in America. It has been customary to assume that the Bronze Age was due to the Phœnicians, but the arguments against it are formidable. The ornamentation of that age consists of geometrical figures—representations of plants and animals being rarely found upon them, while on the shields described by Homer, as well as in the decoration of Solomon's Temple, animals and plants were abundantly represented. The Phœnicians were well acquainted with iron. In Homer, the warriors are armed with iron weapons and the tools used in preparing the materials for the building of Solomon's Temple were of this material.

There is nothing to prove that the Phœnicians were the first navigators, as they do not appear on the Mediterranean Sea until 600 B.C., while history mentions prisoners from the West, depicted on Egyptian monuments, under the name Tokhari, who were vanquished in a naval battle fought by Rameses III thirteen centuries before Christ. They were troublesome to the nations of the East for many centuries, for 700 B.C. they are depicted on the Assyrian monuments. The head dress is the same in both cases, although separated by a period of 600 years. If these people were numerically strong enough to contest the mastery of the sea with one of the powerful kings of Egypt, they must have been in a condition to carry on a commerce along the coasts of the Mediterranean and the Atlantic Ocean. The Pillars of Hercules were known to the people of Atlantis; a representation of it, in the form of an ancient coin, is the original source of the American dollar mark—the combination of the two pillars and the serpent.

This was far anterior in date to the settlements of the Carians and Phœnicians A Persian legend states that they came from the Erythræan Sea. This has been supposed to be the Persian Gulf, but a very old city of Erythræ, in utter ruins at the time of Strabo, which was built in some remote age, near the site of Gades, this being the starting point of their European migrations. There was even an island of Erythræ, the tenth labour of Hercules consisting in driving away the cattle of Gryon, who dwelt on an island of that name, somewhere in the remote west beyond the Pillars of Hercules. The cattle were stolen from thence and driven through Iberia and

Gaul over the Alps into Italy. The legend is the record of a western race migrating eastward, first giving their name to a town in Spain, and at a later date to the Persian Gulf.

In the Bronze Age there was a constant stream of civilisation in the sense of a maritime wave of nations flowing from West to East, and *vice versâ,* that is why the Mediterranean Sea has been the centre of the modern world, because it lay in the path of the extension of an older civilisation (Atlantis) whose ships colonised its shores as they did likewise the shores of America. Plato admits that the nations are gathered around the shores of the Mediterranean Sea like frogs around a marsh. The Egyptian historian records that the Tokhari, as people of the sea, are greatly to be feared.

The knowledge of bronze is parallel with the commercial relations of Atlantis, a small race with very small hands, as shown by the size of the sword hilts; they are not large enough to be used by the modern races of Europe. They were a race with long skulls as contradistinguished from the round skulls of the Stone Age. The fact that the implements came from some common centre and did not originate independently in different countries is proved by the striking similarity which exists between the bronze implements of regions as widely separated as Switzerland, Ireland, Denmark and Africa. It is not to be supposed that any overland communication existed in that early age between these countries. The coincidence of design existing can only be accounted for by the bronze articles being obtained from seagoing people, who carried on trade relations with these people at the same time.

In one bronze figure there is a representation of an Egyptian looking man holding a cup before him, in reality the magnetic needle or mariner's compass, which consisted of a bar of magnetised iron floating upon a piece of wood in a cup. This bronze relic is of great importance as showing knowledge of navigation in that age.

One learns of the habits and customs of the sunken land by means of a bronze urn evidently made to represent a house—the rude fashion in which the door was fastened is clearly depicted. The Mandam Indians build houses of the same appearance at the present day.

Razor-like knives provide the information that the habit of shaving the face or head dates back to great antiquity.

Ships are represented upon them with primitive appendages for sails.

On another are a series of lines. The stars in the sky are ten, and originally ten rings were at one corner, representing the ten kingdoms in Atlantis. A large object in the middle of one ship represents a palm tree, the symbol of Aztlan or Atlantis, and also of Ancient Babylonia.

Although Plato does not assert that Atlanteans possessed the decimal system of numeration, some parts of his narrative point to that conclusion.

There were ten kings, ruling over ten provinces; the whole country was divided into military districts or squares, ten stadia each way; the total equipment of chariots was 10,000; the great canal was 100 feet deep and 10,000 stadia long. In Peru the decimal system was very apparent, as the army was divided into bodies of ten, fifty, a hundred, five hundred, a thousand, and ten thousand. The community at large was registered in the same order, which the Anglo-Saxons adopted in later centuries, thus showing the connection between the people of Atlantis and the Aryan race. It is the universal idea that civilisation came from the East, but it can be proved that it came from the West. The Chinese proclaim that they came from the West. The centre of an Aryan migration is supposed to be Armenia and within the Historical Period. The ships of Atlantis would have no difficulty in reaching there—they evidently did as the Aryan and Central American alphabets are similar. If it be admitted that Europe was peopled from Armenia, it is quite as reasonable to assume that Armenia was peopled originally from the West as the Aryan faces are depicted on the Egyptian monuments 4000 B.C., just as the Semitic race are on those of Central America.

For on the four sides of the altar at Copan are engravings of people with strongly marked Semitic features. Each side represents four individuals. On the west sides are the two principal personages, chiefs or warriors, with their faces opposite each other and apparently engaged in argument or negotiation.

The others are divided into two equal parts and seem to follow their leaders. Each of the two figures is seated crosswise in the Eastern fashion, signifying a joining together or agreement, on a hieroglyphic, descriptive of his name, office or character, of which the serpent forms a part.

But a remarkable cartouche is seen containing two hieroglyphics—a reminder of the Egyptian method of giving the names of kings or heroes, in whose honour monuments were erected.

When it is considered that Egyptians, Hebrews and Mexicans reverenced an Ark, possessed a tradition of the Tower of Babel, organised a species of serpent worship, burnt incense to the four quarters of the globe, called the south its right hand.

The Hebrew and Mexican historical records are similar. As the Red Sea was parted for the former, likewise the Quichuas hand down to posterity that on their migrations to America the sea was parted for them.

The story of the Babylonian national hero, Gilganes, is reproduced in the Samson of the Hebrews and Fipanea of the Quichuas. He also was captured by his enemies and placed in a pit, pulled down the building in which his captors had assembled, killing four hundred of them.

These coincidences are so striking and so numerous that repeated attempts have been made to prove that the inhabitants of America are descended from the lost Ten Tribes of Israel. But the Hebrews never were a maritime people or emigrating peoples, so it is impossible to believe that they left their flocks and herds, marched across Asia, took ships and sailed across the greatest of the oceans to a continent, the existence of which they had no knowledge. In the same manner the Phœnicians are stated to have introduced the worship of Baal from the East, but the place names testify that it was introduced from the Western Baalerium, the old name for Land's End—Baal Hills in Yorkshire, Belan Banks in Shropshire, Belan in Montgomeryshire, the Belch Mountains in the Vosges and Black Forest, the Great Belt, Little Belt, the Balearic Isles, and lastly at the extreme end of the commercial route of Atlantis, Baalbek. Thus words convey the mental treasures of one period to the generations that follow, and laden with this, their precious freight, they sail safely across gulfs of time. The places containing the letters Qu are a survival of the Quiphos, the Mexican system of reckoning and disseminate from Atlantis as a centre. It could not be otherwise as the two letters were only introduced into the English language at the time of the Spanish Armada, although in the ancient Egyptian, Babylonian, Peruvian and Irish from prehistoric times.

They indicate the path of the trader in the Bronze Age. Quito, Quaco, on Bay of Fundy, Quoylach, Bay on the West coast of Ireland, Lake Quoich, on West coast of Scotland, Quiraing Mountains, Quimper, Quiberon in France, Qualloe, Qualboe in Norway, Quintana in Spain, Quarnero in Italy, Quang Lung in China, Quadi, a tribe living on the banks of the Danube, described by Tacitus as obeying a race of kings born among themselves—a contrast to the wild tribes of ancient Germania.

The destruction of Atlantis was the Deluge of Antiquity. It was simply the finale of a number of vast changes by which the continent, once occupying the greater part of the Atlantic Ocean, had gradually been submerged, while new lands were rising on both sides of it. There is ample geological evidence that at one time the British Isles were submerged to the depth of 1,700 feet. What is now Sicily once was beneath the sea, subsequently rising 6,000 feet above it. The sands of the Desert of Sahara are a deposit of the ocean.

Atlantis was destroyed by a terrible convulsion of nature, earthquakes and flood. Plato's statement is upheld because the island was in the centre of a volcanic circle, comprising the volcanoes of Mexico, Bolivia and Peru on the one side, Iceland, Wales, Ireland, France, Spain, Portugal, Cape de Verde, Ascension and St. Helena on the other.

In the *Nautical Magazine* for 1835 and 1838 accounts are given of a series of volcanic phenomena—earthquakes, troubled water, floating scoria and columns of smoke—which had been observed at intervals since the beginning of the last century in a space of open sea between 20° and 22° longitude, about half a degree south of the equator. Charles Darwin asserted that these facts indicated that an island or achipelago was in process of formation in the centre of the Atlantic Ocean.

It is possible that the great fires which destroyed Atlantis are still smouldering in Neptune's depths and that the vast oscillations may again bring up Plato's Island. But it survives in the Flood legends of the world which emanated from it. The accounts given in Hebrew literature is the form that would be natural to an island people, the principal destruction being by the agency of rain—hence the greater period of the Deluge to give time enough for rain to fall and consequently drain off from the land.

It is a very remarkable fact that the American traditions of the Deluge (Mexican) are nearer to the Chaldean and Hebrew, especially the Mexican, than those of the people of the Old World. The emigrants from Asia into North America by the Kurile and Aleutian Islands could not have brought them, because their literature does not contain them. Neither do those of the Buddhists. They were derived from an actual knowledge of Atlantis possessed by the Americans themselves.

Henceforth the Atlantic Ocean was known as the Dark Sea by the classical writers. In Proclus a work now lost, which is quoted by Boeckh in his commentary on Plato, mentions islands in the exterior sea beyond the Pillars of Hercules. It was known in one of these islands the inhabitants preserved from their ancestors a remembrance of Atlantis, an extremely large island which for a long time held dominion over all the islands of the Atlantic.

Ælian, in his Varia Historian, records that Theopompus related the particulars of a conversation between Midas, King of Phyrgia, and Silennus, in which the latter reported the existence of a continent beyond the Atlantic Ocean.

The Gauls possessed traditions which were collected by the Roman historian.

The Egyptians were the only people of antiquity who were well informed as to the history of Atlantis, their conception of the universe proves it, and from whom the Hebrews acquired geographical knowledge and adapting it to their own environment. They were never a maritime people, so the knowledge of Atlantis must have been brought to them. One proof is their belief in the under world. The Land of the Dead was situated in the West, hence the tombs were all placed, where possible, on the west bank of the River Nile; if on the east a sacred lake was crossed. The constant cry of the mourners was "To the West, to the West." On the coast of Brittany, where Cape Raz stands out westward, there is the Bay of Souls, the launching place where the departed souls sail off across the sea.

Everywhere in the ancient world the minds of men thus looked to the West; it was a survival of an ancient belief, and based on a universal tradition, that under an immense ocean in the far West there was an underworld, a mighty race.

Plato's statement regarding himself, "I grow in learning as I grow in age," may be applied to the world of to-day. A thousand years ago it was believed that the legends of the buried cities of Herculeam and Pompei were myths; they were spoken of as the fabulous cities. Herodotus' accounts of the wonders of the ancient civilisations of the Nile and Chaldea were discredited; he was styled, even by the educated world, as the Father of Fabricators. Even Plutarch sneered at him. Now his minute information regarding those regions is admitted by all geographers, so in the future it will be with Plato, for, in the words of Festus:

"The earth has made such comet-like advance
Lately on Science, we may almost hope
Before we die of sheer decay, to learn
Something about our infancy, when lived
That great original (broad-eyed) sunken race,
Whose knowledge, like the sea sustaining rocks,
Hath formed the base of this world's fluctuous lore."

# DID PEARY REACH THE POLE?

By Rev. J. Gordon Hayes, M.A. (Cantab.).

(Delivered to the Society, November 10th, 1922.)

## Introductory.

One morning, during the long vacation of 1909, I was in the garden of my home at Worcester, when the daily paper brought the news that Dr. Cook had reached the North Pole. His dauntless spirit was generally admired, and there was no disposition to doubt his achievement, until Peary returned with the claim that *he* had attained the Pole, and that Cook was a base impostor. The newspaper press, unfortunately, is almost the only source of information for the general public. Peary was victorious, according to the papers, in the controversy that followed, and we were informed that Cook had disappeared into the oblivion from which he ought never to have emerged to hoax a trustful world.

Thus matters stand with the public yet, insofar as the event has been remembered, and thus they would have stood with myself had I not, in July 1920, noticed a book by Mr. E. S. Balch, an American geographer, in the Cambridge University Library. This book, which was entitled "The North Pole and Bradley Land," appeared to be written in a scholarly manner, and to hold the scales impartially between Peary and Cook; yet, to my surprise, it brought forward evidence that *both* these explorers had reached the Pole. The evidence given was of such a character as to make it clear that the press had misled the public eleven years before. It became apparent that only one side had been properly heard, so that the other side may have suffered the gravest injustice. Such a state of things could not be allowed to continue, so I determined to sift the matter thoroughly, and if possible to find out the truth. Before leaving the library the further discovery was made that Dr. Cook had *not* sunk into oblivion, for he had published a work which he had named "My Attainment of the Pole," in June 1911, in which he fully stated his case and replied to all criticisms. It would be very remarkable, I thought, if a dishonest man, who had been laughed out of court, came forward again; but it would not be strange if one, who had been overborne by sheer weight of numbers, took the first opportunity to reassert his innocence.

I determined, therefore, to collect all the evidence, and to give the most careful consideration to the whole subject. I felt that Admiral Peary, as the senior and more eminent explorer, and whose name was unsullied by the breath of slander, should have the first hearing; and this agreed well with my own inclination, for I thought that there would be no great difficulty in disposing of Cook and settling the business in Peary's favour. The spare time of the last two years has been devoted to an examination of Peary's claims, the principal results of which are now to be submitted. The actual "North Polar controversy" is to be avoided as far as possible, for, as Mr. Balch says, the geographical evidence was mainly side-tracked in the newspapers, and the real facts obscured under a cloud of irrelevant matter.[1]

It may be well to affirm that the above title is far from being designedly presumptuous or hypercritical. The writer's purpose is to search after truth. Some well-attested facts will be presented which, it is hoped, will show at least the need for a most carefuly inquiry. Professional etiquette naturally precludes contemporary British explorers from expressing publicly their views on this subject; but it will be found, I think, that they support, in the main, the conclusions independently arrived at herein.

## I.

In the third appendix of the late Admiral Peary's well-known book, "The North Pole," we are given a copy of the report presented by the sub-committee of the National Geographic Society of America on this explorer's claim to have attained the Pole. The report states that after examining "his original journal and record of observations, together with all his instruments and apparatus," the committee "are unanimously of the opinion that Commander Peary reached the North Pole on April 6, 1909." This sounded convincing, and upon this alone the civilised world acclaimed Peary as the conqueror of the Pole.

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1. "The North Pole and Bradley Land." page 29.

The National Geographic Society had been extremely speedy in arriving at their important conclusion. Their report was issued about a month after Peary returned, while mature consideration has shown it to be quite a complicated business.

Mr. E. S. Balch has subsequently found it well to restrict the proof of Peary's achievement to his astronomical observations alone,[1] but these would appear to form a somewhat infirm basis upon which to erect so grandiose a claim. For Peary maintained that he was the only discoverer of the Pole, the geographical position of which he said he had located to within less than five miles. It is usual for explorers, on their return, to submit a detailed account of their exploits, which generally, and most commendably, takes the form of their daily journal, frequently published *verbatim*. Peary has not made it clear whether he even kept a journal on his last journey. The Geographic Committee mentions one in its report, but an official document of the United States Government will be quoted to show that this cannot be depended upon.[2] Peary has, however, presented a narrative in the book referred to, in which he has given us all his information. His claim must surely rest upon the sum total of his records, as enumerated by the committee which professed to have examined them. There is good reason for dwelling upon this point, as will appear in due course.

It is not usual to judge explorers by their observations alone but by a comprehensive survey of all that they have done, as presented to the world in the official records of their journeys. The writer, acting upon this, has analysed the records of all the recent polar explorers, and every record, except that of Peary, has been found perfectly straightforward. Dr. Nansen, Captains Scott, Amundsen and Sverdrup, Sir Ernest Shackleton, Sir Douglas Mawson and others, have all presented credible and consistent narratives. Peary's record of his last journey, on the other hand, is confused and self-contradictory. It is sometimes impossible to find out, from his own account, what he has actually done. Attempt after attempt to make one part of Peary's book agree with other parts had to be abandoned, yet even then no doubts had arisen as to his conquest of the Pole. The confusion of his story, however, was certain to make one critical. The suppression of some facts, the rapid slurring over of others of great importance, the undue magnification of some details of no scientific value, as well as the, apparently, carefully planned diversions to lead the mind of the reader away from the main plot into side issues, all these things naturally make one suspicious. At length, in the course of one final effort to get at the truth about his journey, if it were possible from his book, it was discovered that he had somehow got from the Pole to 87° 47′ north latitude, a distance of *130 geographical miles in two days,* but that he had said little or nothing about this miraculous performance, practically dismissing it in a few sentences, while filling his pages, which should have explained how he managed to do it, with lengthy descriptions of other matters. It became necessary, therefore, to investigate his records in a thoroughly methodical manner.

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[1] "The North Pole and Bradley Land." page 50.

[2] See page 147.

In order to prepare ourselves for this undertaking we need to briefly review the efforts of other explorers, most of whom were in no way inferior to Peary, and some of whom were decidedly greater scientists than he. We shall then be in a better position to judge him ourselves, and what is, perhaps, even more important, we may find that they form a polar court of justice in which he will receive the judgment of his peers.

## PREPARATORY SURVEY.

The principal pioneer of recent polar exploration was Dr. Nansen, who on his famous journey of 1895 developed a system of dog-sledging that has been followed, with minor modifications, ever since. We shall be upon safe ground, therefore, if we take notice of the rate of progress which he and his successors found possible over the frozen surface of the Arctic Ocean. Claims of excessively long daily distances over the polar ice-pack will always be received with considerable hesitation, if received at all, by those who realise its condition as a sledging surface. Thus we find that Nansen was able to average only about six miles per day, though he covered about seven miles per march. The latter is the better basis for comparative statistics, than computing the mileage per diem, when dealing with sledging speeds and distances, as it eliminates the days on which no march is made. All miles, unless otherwise stated, are geographical.

In the year 1900 Peary made his first attempt at sledging on the Arctic pack-ice, but his account of it is extremely brief.[1] He set out from the most northerly point of Greenland, and had to contend with pressure ridges 50 feet high. This height is mentioned twice. In consequence of this terrific disturbance of the ice, and a large lane of open water, he could not get further than 3½ marches from land. This is all we are told. Meanwhile H.R.H. the Duke of the Abruzzi was making Arctic history.

All the expeditions of Prince Louis of Savoy have been designed and executed in a manner that can only be designated as splendid. On his polar venture in the year 1900, H.R.H. appointed, as his second in command, Commander Umberto Cagni of the Royal Italian Navy, who had accompanied him on the first ascent of Mt. St. Elias in Alaska three years earlier. Cagni's march to latitude 86° 34′ N. was one of the greatest polar journeys ever made, and worthy to be compared with those of Scott, Amundsen and Shackleton. For two months he had to contend with temperatures that are probably the lowest on record for any extended summer journey, ranging down to minus 65° F. The entire distance travelled was 753 miles, in 104 days, or about 7¼ miles per day, but this does not give a correct estimation of the speed attained, because of the disintegration of the pack during the last hundred miles of the return. The average speed for the 34 northward marches (373 miles) was 10.9 miles per march; for 665 miles, until the pack began to break up, it was 12½ miles per march, and the best 372 continuous miles averaged as much as 15½ miles per march. This was such a fine performance that up to this day it has never been beaten on the Arctic pack by any other journey of equal length, *that is beyond dispute.*

In 1902 Peary made his second assault on the polar ice, this time from Cape Hecla in Grant Land, accompanied by Henson and some Eskimos.[2] He had laboriously prepared for this effort, and even dreamt of reaching the Pole; but he was able to struggle northward for only 16 days, and attain latitude 84° 17′ N., which was 97 miles short of the record Nansen had established seven years earlier, and 117 miles behind Cagni. The latitude of Cape Hecla is not given, but

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1. " Nearest the Pole," page 327.
2. "Nearest the Pole," page 340 and following pages.

it is shown on Peary's maps at about 82° 50′ N. His distance northward, therefore, was no more than 87 miles, covered at an average rate of 6.28 miles per march, or nearly the same speed as Nansen for a much shorter distance than his. The pack for a hundred miles or more north of Greenland and Grant Land is more disturbed than it is far out in the depths of the ocean where Nansen and Cagni travelled. Partly on this account Cagni maintained double Peary's speed for eight times the distance, and 2½ times the speed for four times Peary's distance. All these figures will be tabulated shortly.

In 1906 Peary made a much greater attempt.[1] He built the "Roosevelt," which seemed to be an ideal ship for his purpose, and was able to get his base right up on the shore of the polar ocean. This expedition was exceedingly well equipped. Peary blames an exceptional season, which disrupted the pack, for his failure to attain the Pole that year. It is true that he was held up for thirteen days by storms and open water, but even then he lost only four marches more than in 1909, and at the rate he travelled in 1906 these four would not have taken him more than 30 miles towards the 164 miles he was short of the Pole. The stormy season was a specious excuse for, rather than the cause of, his failure. The actual cause we shall see in a moment, but first we must note that *Peary gives the distance travelled on no more than* 6, *out of a total of* 75 *to* 80 *days,* a sure sign that things were not going well.

He has published very few exact particulars of this journey, so that we do not know even the number of marches he made on his return; and for the second time he has not given the latitude of his point of departure from land. It was Point Moss, and his maps make it 82° 55′ N. From this we find that the length of his journey to latitude 87° 6′ N. was 251 miles, and, as he gives the number of his marches at 34, he averaged no more than 7.3 miles per march. Thus the cause of his failure to reach the Pole in 1906 was that he did not travel fast enough. He tried to hide this fact from the public, but he learnt the lesson well enough himself, as we shall see when we come to his last attempt.

We have seen that Peary gives his mileage on only six days. Four of these marches were of 12 miles, and the other

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1. "Nearest the Pole," especially Chapters 5, 6 and 7.

two of 30 miles each. These two were on consecutive days, just after a week's rest, and when every nerve was strained to the utmost, in order to snatch at least a world's record out of his Polar defeat. He surpassed the Duke of the Abruzzi's latitude, indeed, by 32 miles, but it was done, according to Peary's own account of it, by an utterly reckless dash which nearly cost the lives of all in his party. This is the only occasion when Peary claims to have travelled at so high a speed as three miles per hour over the Polar pack. This speed appears to have been maintained for no longer than one day, as on the second day he merely states that they "travelled at a good pace," and by the third day it is certain that they had dropped to 2½ miles per hour. One meets here with the usual difficulty found in all Peary's books, that the narrative is not self-consistent. Before starting the 30-mile marches he gives the latitude at 85° 12′ N.,[1] so that it was 86° 12′ N. after the second day, April 14th. He vividly represents the next seven days as being one wild rush, but as the distance to 87° 6′ N. is only another 54 miles he could not have averaged more than 7.7 miles per day during this week. As a matter of fact, the speed seems to be even less than this, for Peary clearly intimates that they were travelling ten hours each day, in which case they did 25 miles on the 15th, leaving no more than 29 miles for the last six days' "rush," or an average of less than six miles per day. We cannot profess to exhaust this problem now, for other difficulties of the same kind await our attention.

Peary writes of the other four days: "Ten years ago I would have called these marches fully 15 miles each, now I hoped they were at least 12."[2] He never attempted to use a sledgemeter, one result of this being that there was no check on his estimated distances, except his observations, and it will be seen that these were not reliable.[3] From the statement just quoted we must learn to receive his earlier mileages "cum grano salis" or two! The meagre information he has given concerning his 1906 attempt is useful as far as it goes, but he gives no distances for 28 out of the 34 outward marches. He did 108 miles on the six days which he records, leaving about 130 miles for the rest of the journey, or *an average of between four and five miles per march,* not per day.

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[1] "Nearest the Pole," page 129.

[2] "Nearest the Pole," page 112.

[3] See page 144.

So far we have seen that, except for two or three days which are doubtful, Peary had not been particularly speedy in his perambulations over the pack. Even in 1906 he had not travelled appreciably faster than Nansen eleven years earlier, both of them having averaged about seven miles per march; and he was far behind Cagni, who had *nearly* doubled Peary's speed for more than double the distance, and *more than* doubled it for a distance that exceeded Peary's by 120 miles. The two or three exceptional marches of 25 to 30 miles are of course reckoned in these averages, but, as already pointed out, the account of this final spurt in 1906 is confused, so that these high speeds must be received with caution. This is seen to be all the more necessary when compared with Cagni's longest marches. Cagni made ten marches of twenty miles and over, including two of 21, one of 22, and one, the first day of their return, of 28½ miles. As Peary was not able to average half Cagni's speed over long distances, or indeed to travel such distances at all, is it reasonable to suppose that he could exceed Cagni's longest marches even on two days? Nansen had made five marches of 20 miles and more, including one of 21, and another of as much as 25 miles. If Peary had not misrepresented his final spurt as being such a wild rush throughout, when his latitudes show that on six days out of the nine he averaged less than six miles a day, one might have credited his claim to have covered a degree in two days, but in the writer's opinion these big marches are somewhat dubious. We are now in a position to examine his last expedition.

## II. THE 1909 EXPEDITION.

The authorities for this expedition appear to be as follows:

1. Peary's work, "The North Pole, its Discovery in 1909, etc.," published by the Frederick A. Stokes Co. The copy used was produced in September 1910, so that any corrections should have been made. There were one or two earlier editions. The book contains Mr. Grosvenor's map, also dated 1910.

2. "The Geographical Journal," Vol. 36, No. 2, August 1910, which contains Peary's lecture at the Albert Hall on May 4th, 1910.

3. "The Bulletin of the American Geographical Society,"

Vol. 41, No. 9, September 1909. This gives a brief summary of the First Accounts of both Peary and Cook.

4. "The National Geographic Magazine," Vol. 20, No. 10, October 1909, which gives the First Accounts of both Peary and Cook, with a note that the records of the explorers had not then been examined.

5. "The Geographical Journal," Vol. 34, No. 4, October 1909. This summarises the first accounts of both explorers, adding one or two brief comments and a map.

The first of these, although a popular account, appears to be the only detailed official record that Peary ever published. There is nothing of any great importance in the other three accounts that is omitted from the book. One or two slight variations will be mentioned, but more frequently the language used in 1 and 2 is identical. We have never been given, what is of the greatest consequence, a copy of the actual journal or sledging diary. Peary's book has, perforce, to be used throughout the present inquiry.

The resources of the United States seem to have been lavished upon the final attempt of their favourite explorer to attain his life's ambition, the North Pole. Their great President, Theodore Roosevelt, took the keenest interest in the expedition and went to see it off. It was magnificently equipped, including even a pianola, and had excellent men on the staff. We are concerned now solely with the actual polar journey. Peary had reversed his earlier principle, that the greatest efficiency in sledging was to be obtained with the smallest convenient party, and by 1909 had developed a huge organisation on a new system.[1]

Incidentally we should notice that this *so-called* "Peary System" was not originated by Peary, as he represents, but was taken bodily from the Duke of the Abruzzi's recommendations, and without acknowledgment, according to the *authentic* Peary system. The Duke's system, in briefest outline, was as follows :[2] to take a ship as far north as possible by the Smith Sound route, and to pay special attention to the first period of the journey over the pack, which would be across the rugged belt of ice found against every coast. His Royal Highness, writing in 1902, laid it down that "Several men must be employed to clear the way here."[1] In 1910 Peary wrote " The pioneer party is original with my expeditions and for that reason it is perhaps worth while to describe it in detail." He had first used pioneers in 1906. The Duke continues: " When this belt is passed the ice becomes comparatively better . . . . This second period will be totally different from the first. The advance should be made with a few picked men," when the Pole if not reached, would be very nearly attained. Most of the details that Peary gives of his system are quite general, only one item being entirely his own. This is the use of Eskimos, but Stefansson has shown conclusively that white men are their superiors in every way.

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[1] "The North Pole," page 201, etc.

[2] "On the 'Polar Star' in the Arctic Sea," page 272, etc.

To return to Peary's last expedition. On March 1st, 1909, he headed northward from Cape Columbia in the rear of a procession of 24 men, 19 sledges and 133 dogs. The 289 miles to latitude 87° 47′ N., where Bartlett and the last supporting party returned, were covered exactly in the month of March, 31 days, and this averages, also exactly, 9 miles a day. But as they were held up for six days by the Big Lead, and lost two other days in addition, they had made 23 marches, which averages 12 miles per march. This was a decided improvement on 1906, as it was nearly double the speed for 40 miles greater distance; but it was still far behind Cagni's best 372 miles, when he maintained 3½ miles per march more than Peary for a longer distance. This was largely due to driving in the Alaskan or tandem fashion, as Amundsen drove. Peary always drove on the Greenland fan system.

SCHEDULE OF PEARY'S POLAR JOURNEY. OCEANIC STAGE, 1909.

| Date. | Lat. N. | T.°F. | Notes, Ice-conditions, Weather, &c. | Miles. Geo. |
|---|---|---|---|---|
| Mar. 1. | *83° 8′* | 50 | Peary left Columbia. Very rough. Much press. ½ gale, drift. | 10 |
| 2 | | | Held up by lead. 96 fath. Very rough. Much Press. ½ gale, drift. | 11⅔* |
| 3 | | | Trouble with leads. Very rough. Ice active. ½ gale. | 11⅔* |
| 4 | | 9 | Leads worse. Bartlett held up. Ice active | 11⅔* |

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[1] *Ibid.*, page 274.

| Date. | Lat. N. | T.°F. | Notes, Ice-conditions, Weather, &c. | Miles. Geo. |
|---|---|---|---|---|
| Mar. 5 | *83° 53′* | 20 | Held up by big lead. Good. Sun. | 0 |
| 6 | | | " " " " | 0 |
| 7 | | | " " " " | 0 |
| 8 | | 5 | " " " " | 0 |
| 9 | | to | " " " " | 0 |
| 10 | | 32 | " " " " | 0 |
| 11 | | 40 | Crossed 7 leads. Ice in motion. Calm. Clear | 12 |
| 12 | | 45 | Crossed narrow leads. Many cracks, then old floes. Clear. | 12 |
| 13 | | 59 | First 5 miles very rough, fairly good after. Calm. Sun. | 12 |
| 14 | *84° 29′* | | Goodsell returns. (MacMillan on 15th). | 0 |
| 15 | | 50 | Held up by leads. 825 F. Ice active. Old. Fair Fine. Keen E. wind. | 5½* |
| 16 | | 50 | Held up by leads. Rough. Ice active. Rubble | 5½* |
| 17 | | | Held up by leads. Pressure. Ice active. | 5½* |
| 18 | | | (*Not mentioned apparently. The account is confused here*). | 5½* |
| 19 | | 50 | Rough at first. Raftered. Sun | 17 |
| 20 | *85° 23′* | | Borup returns. Ice better, though not good. | 15 |
| 21 | | 40 | 310 fathoms at a lead. Sun. Fine. | 10 |
| 22 | | 40 | 700 fathoms no bottom. Rough at first, then more level. Sun. Fine. | 15 |
| 23 | 85° 48′ | 30 | First obs. before this march. Trouble with leads. Mist. | 15 |
| 24 | | | Reach Cp. Nansen. Heavy pressure. Mist. | 15 |
| 25 | | 30 | Several leads. Track of bear. Better going. A snowstorm | 20 |
| 26 | 86° 38′ | 20 | Obs. Cp. Abruzzi before march. Lead. ¾ level, ¼ rough. Fine, dull. | 15 |
| 27 | | 40 | Broken, raftered ice, heavy rubble. Tracks foxes. Bright sun. | 12 |
| 28 | | | Held up by leads. Ice active. Better going. Sun. Clear. Cold. | 12 |
| 29 | | | Held up by "an open sea." 1260, no bottom. Active. | 0 |
| 30 | | 30 | About 87° better ice, young, active. Cracks. N. wind. | 20 |
| 31 | | 30 | Going good. Thick. N. wind | 20 |
| Apr. 1 | 87° 47′ | | BARTLETT RETURNS. Obs. Sun. | 0 |
| 2 | | 25 | Pressure 50 feet high. Two leads. Floes large, level. Sun. Clear. | 25 |
| 3 | | | Pressure. A lead. Sun. Clear. | 20 |
| 3-4 | | 40 | Infrequent ridges. Level and hard. Sun. | 25 |
| 4-5 | 89° 25′ | | Obs. Ice better. Sun. | 28 |
| 5-6 | 89° 57′ | 15 | Obs. Cp. Jesup. POLE. Ice better. Sun. | 32 |

| Date. | Lat. N. | T.°F. | Notes, Ice-conditions, Weather, &c. | Miles. Geo. |
|---|---|---|---|---|
| Ap. 6-7 | | 11 | Obs. and travelling till 4 p.m. on 7th. Sun | 36 |
| 7-8 | | 30 | Took sounding, 1500 fathoms, no bottom Sun. | 85 |
| 9 | 87° 47′ | 20 | Reach Bartlett's igloos. N.N.E. gale. | 45 |
| 10 | | | | 20 |
| 11 | | | Recent fox tracks. Sun. | 32 |
| 12 | | | Camp Abruzzi reached. | 27 |
| 13 | | | Camp Nansen reached. Fresh S.W. Wind | 20 |
| 14 | | | Sun. Calm. | 15 |
| 15 | | | Recent bear track | 30 |
| 16-17 | | | | 25 |
| 18 | | | Fine. Warm. | 17 |
| 18-19 | | | Fine. | 22 |
| 20 | | | Fine. | 24 |
| 20-21 | | 30 | Crossed Big Lead on 21st. Fine. | 12 |
| 21-22 | | | | 22½* |
| 22-23 | | | Reached C. Columbia 6 a.m. on 23rd. | 22½* |

* Average day's march not given.

*Note.*—Latitude in italics not given by Peary. All temperatures are minus.

Peary having now covered two-thirds of his journey to the Pole, and having reached a crucial point, we must more closely consider his book. As a serious work of exploration "The North Pole" leaves very much to be desired. The author is not exact in his statements, and is marvellously adroit at evading accurate information. He gives very little data of any value, for he had not a scientific mind; yet this is perhaps the most necessary part of an explorer's mental equipment, if his work is to be of much use.

Let us carefully examine Peary's account of his final spurt to the Pole,[1] which the diagrams and schedules will help to elucidate.[2] The spurt began from the important spot, in latitude 87° 47′ N., from whence Captain Bartlett returned. The party consisted of Peary, Henson and four Eskimos, with five sledges and 40 picked dogs.[3] They started from Bartlett's last camp soon after midnight of April 1-2, with men and dogs feeling "the keenest exhilaration and even exultation," and

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1. "The North Pole." Chapters 30—32.
2. See Plates I. and IV. at the end. The Schedules will appear later.
3. But see the evidence given before the Naval Committee, pages 50—52.

completed 25 miles without a halt in 10 hours. The conditions were as favourable as could possibly be expected, yet his speed, it will be noticed, did not exceed 2½ miles an hour. They would camp on that day a little before noon, but for some reason which is not given they got only a few hours' sleep, although they had from 12 to 15 hours in camp. They arose early on the morning of the 3rd, that is to say soon after midnight, but being delayed by pressure and a lead they covered only 20 miles in a second ten-hours' march. Their speed had therefore fallen to two miles an hour. They had now reached latitude 88° 32′ N., and would camp between 10 a.m. and noon, yet for the second time Peary says "we slept only a few hours."[1] This time they started off again before midnight, but even then they had about twelve hours in camp. Their march of April 3-4, which brought them to 88° 57′ N., was one of 25 miles in ten hours under perfect conditions, but Peary says they "were all pretty tired" at the end of it. Three marches of less than 25 miles a day (average) had sufficed to work off all their superfluous energy, although their speed had never exceeded 2½ miles an hour. Peary began to eliminate the poorest dogs here, though only two days before they all seemed to be in perfect condition. The men appear to have had insufficient sleep, but no reason for this is adduced. This is one of the difficulties of the narrative to which we shall return. At this camp on the 4th, for the third day in succession, it is said that they "stopped for only a short sleep," and hit the trail again "early in the evening of the same day, the 4th." We can well believe that they "were all pretty well played out" at the end of it, for they then travelled 30 miles. They had a little more sleep here. They had travelled 75 geographical miles on three short sleeps, yet there were 24 hours to each day and they only marched during ten of them. Another dog was killed here.

We must note, in passing, that from his latitudes, 88° 57′ to 89° 25′, the distance travelled on April 4-5 must have been 28 instead of 30 miles. In like manner, if we may anticipate, the next march was 32 instead of 30 miles. Such trifling inaccuracies did not worry Peary, and of course 30 was the average. He took a latitude sight here.

The party were now supposed to have reached 89° 25′ north latitude, and would begin to camp about 8 a.m. or 9 a.m. on the 5th. They had 13 to 14 hours here and a little more sleep, starting off on their last outward march before midnight, say at about 10 p.m. We are told that after travelling 15 miles they stopped for tea. This would be about 4 a.m. or 5 a.m. on the eventful 6th of April, 1909. The actual distance was probably 16 miles. By 10 a.m. they had covered a second 16 miles (Peary says 15), which brought them to Camp Jesup in 89° 57′ N. According to Peary's figures their travelling time had been 12 hours for the 30 miles he gives, or exactly 2½ miles an hour when on the march. As the distance must have been 32 miles their speed would be a trifle over this. At Camp Jesup, after taking observations, they slept again for their usual "few hours," though why Peary should be so apologetic about sleeping, as though it were a superfluous luxury, one cannot conceive. As he intended to take observations at 6 p.m. they could not have slept more than about six hours on this occasion. Peary then went south, across the Pole, for 10 miles, and took observations at midnight, returning to Camp Jesup for another set at 6 a.m. on the 7th. He next went out 8 miles East, and returned for noon observations, after which he confesses that he was "utterly exhausted body and brain," as he had a perfect right to be after all his exertions. He was too excited to sleep, and at 4 p.m. on the same day he started to return.

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[1] "The North Pole," page 280.

He writes, on page 7 of his book: "The North Pole was reached on April 6, at 10 o'clock in the morning. I spent 30 hours at the Pole. . . . The six of us left the much-desired 'Ninety North' on April 7 on the return journey." On page 301 he says: "About 4 o'clock on the afternoon of the 7th of April we turned our backs upon the camp at the North Pole." In order that there should be no mistake he writes the same statement a third time on the next page. This is most important, as we shall shortly see. After a page devoted to the perils of the way he outlines his plan of making double marches on the return journey, eating lunch at one of the igloo-camps erected on the outward journey, and sleeping, if he could spare time for sleep, only at each alternate outward camp. He then speaks of the difficulties of open leads and drifting ice, and not until after 2½ pages does he begin to give the narrative of the actual journey. Two pages (from 304 to 306) are devoted to the return from Camp Jesup in

89° 57′ N. to Bartlett's last camp, but the first half-page is occupied with an account of a sounding that was taken. Thus there is only one page and a half assigned to the description of the most marvellous sledge-journey ever performed by man, when a distance of 130 geographical, or 150 statute, miles was covered in the phenomenally short time of two days. These marvellous marches are shown on the left-hand side of the centre-line on the diagram.[1]

What makes this even more remarkable is the fact that a man of Peary's temperament should make so little of it. Instead of drawing the attention of the world to the brilliance of this extraordinary feat, according to his custom, it is passed over as if he were ashamed of it. The account he gives suggests a desire to veil his glory. Such modesty is unexampled in all his writings and excites our curiosity to find out why he should endeavour to conceal this, which was not only his own greatest sledging achievement, but which more than trebled the previous world's record for sledging over the Arctic Pack. Fortunately, it is not very difficult to reconstruct this record march from the material he has himself supplied.

In considering Peary's speed on his return it must be remembered that when he and his equipage left the Pole they had already travelled 545 geographical miles since leaving the ship. The "Roosevelt" was at Cape Sheridan, 90 miles from Cape Columbia, where they left the land. They had averaged very nearly 15 miles per march from Cape Columbia, which was 419 miles from the Pole. This was double the speed of 1906 for nearly double the distance from land. During the six days previous to leaving the Pole they had averaged 27.6 miles per day. They had travelled 36 miles about the Pole, and were setting out on their return with very little rest. So that, while they *may* have been fit enough to make fairly long marches, though even this is doubtful, they were certainly not sufficiently fresh for any record-breaking speeds. Indeed, we have Peary's previous experience to fall back upon, for he writes, concerning the start of his return in 1906: "The interest and excitement of the advance were gone, the reaction had come and my feet dragged like lead. As a matter of fact the return journey, after the eagerness and excitement of pushing ahead is over, is always the hardest part of the work."[1] All this was accentuated in 1909 by the increased strain of the greater distance, and by their pronounced exhaustion, as the result of the final spurt, to which reference is made several times. We are now in a position to examine, and to reconstruct, Peary's record of his return to Bartlett's last camp.

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[1] Plate I. at end.

### PEARY'S RETURN TO BARTLETT'S LAST CAMP, AT 2½ MILES AN HOUR.

| | | Lat. N. |
|---|---|---|
| April 7th. | 4 p.m. started from Camp Jesup | 89° 57′ |
| | 6 p.m. stopped for sounding. | 89° 52′ |
| | 8 p.m. started 21-mile march. | |
| „ 8th. | 7 a.m. First sleep, 4-5 hours. | 89° 25′ |
| | 1 p.m. started 28-mile march. | |
| | 12 (midnight) reached lunch-igloo. | 88° 57′ |
| „ 9th. | 3 a.m. started 25-mile march. | |
| | 1 p.m. second sleep. | 88° 32′ |
| | 10 p.m. 45 *MILES TO MARCH BEFORE MIDNIGHT* | to 87° 47′ |

### The Return from the Pole to Bartlett's Last Camp.

Peary left Camp Jesup (89° 57′ N.) at 4 p.m. on April 7th, and after going five miles stopped to take a sounding. Reasons have been given to show that the speed could hardly be more than 2½ geographical miles an hour. The party might have slightly exceeded this rate for short spells, but the only safe assumption, in the absence of definite information, will be to keep to this rate of travel throughout the return to latitude 87° 47′ N. They were not in good enough condition to have increased it for any length of time, and their average, during this remarkable part of their journey, was most probably less than this. Hence it would be about 6 p.m. when they stopped to make ready the sounding apparatus. It was recent ice, the thickness of which is not given. They had to chop through it, and as they found 1,500 fathoms with no bottom it must have been at least 8 p.m., and possibly 9 p.m., before they resumed the trail. They abandoned the sounding apparatus, which weighed 18 lbs.

They had to travel 27 miles to the last outward camp in 89° 25′ N. They would arrive here, if they could do the distance without a halt, at about 7 a.m. or 8 a.m. on the 8th.

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[1] "Nearest the Pole," page 139.

It is extremely doubtful if they would be able to march the whole distance without stopping, for on the final spurt to the Pole they had made a halt for tea half-way, and they were in better form on the outward journey than on the return. They had their old tracks to follow, but this did not make so much difference in that locality. At 89° 25′ N. they slept "a few hours," of which four or five would be very few indeed, as it will be seen when it is remembered how little sleep they had obtained during the last week.

They had their last good rest at this camp on the outward journey, for Peary writes: "We were all pretty well played out and in need of rest." This was on April 5th, but on the three previous days they had been able to get no more than their regulation "few hours sleep." On arriving at Camp Jesup on the 6th he says they felt "the accumulated weariness of all the days and nights of forced marches and insufficient sleep," indeed he was actually too exhausted to realise that his life's purpose had been achieved, so they had "a few hours of absolutely necessary sleep"; but he says that he could not sleep long, and it must have been less than six hours. He was far too busy, afterwards, travelling about and taking observations, to think of rest until the afternoon of the 7th, and then he could not get to sleep when he tried, so they started off. They had travelled, according to Peary's account, 115 statute miles with less than six hours' sleep, and 78 *miles without any sleep whatever.* The medical faculty might be able to say if this was possible, as it seems quite incredible to the ordinary man. They must have been in the exhausted state that Peary mentions, but *how could men and dogs in that condition dash off nearly one hundred miles in a day?*

The very shortest halt that we can assume they made at 89° 25′ N. is six hours, during which they would have two meals and four or five hours' sleep. It would then be from 1 p.m. to 2 p.m. on the 8th when they started off again, if they could do so after so little rest. Assuming that they were still able to maintain a speed of 2½ geographical miles an hour it would be 1 a.m. or 2 a.m. on the 9th when they reached the lunch-igloo 28 miles away, in 88° 57′ N., again supposing that the whole run could be accomplished without a halt. This is very unlikely, to say the least of it, and perhaps impossible with tired dogs. The weather was fine. Peary tells us that it was necessary to rest the dogs here, which is quite natural after 600 miles of sledging, ending with a week at 32 statute miles a day before leaving the Pole: but it hardly accords with the energy necessary to cover 150 miles in two days. Three hours would not be much rest for the dogs, but assuming that they had no more than this they would leave the lunch-igloo at 4 a.m. It was 25 miles to the next outward camp, and we are told that it took all their will-power to reach it, as we can well believe. We cannot believe that they could maintain the high average of 2½ miles an hour throughout this march, for this speed is very nearly the highest Peary ever claims to have done, and his dogs were getting played out. But, to give him a better chance than he could actually have had, and assuming that which is nearly, if not quite, impossible, it would be 2 p.m. on the 9th when they got their second sleep after leaving the Pole. This was in latitude 88° 32′N.

Human and canine endurance had at last been strained to its limit, and we are told that they could hardly keep awake to eat their supper. This must have been a long rest, for outraged nature always takes her revenge, so they must have slept at least 8 or 9 hours. They had then travelled 61 statute miles since their last little nap, and 139 *miles with no more than four or five hours sleep*. This seems quite incredible, but Peary intimates that they had learnt the secret of tireless exertion, for they must have covered well over 200 *miles on two short naps*. We are not told how they managed to keep awake as they raced along. Even nine hours halt here would bring the time to 11 p.m. on the 9th, but Peary says that they had done a further 45 geographical miles before then, or by the night of the 9th. This is the miracle that he ignores. We must therefore draw attention to the flimsiness of his account.[1]

He gives a very curt description of a perfectly miraculous performance. We are merely told, on page 304, that, after taking the sounding, "The first camp, at 89° 25′, was reached in good time." This is a very bald account of the first stage of one of the most remarkable journeys on human record. It was a trudge of 36.8 statute miles over the polar wastes on the part of exhausted men and dogs, who had obtained no sleep since doing 41½ statute miles about the Pole, who had been working incessantly for 24 hours when they set out, and whose only rest, 24 hours before, had been of less than six hours at the end of a previous 39-mile journey. It must have been an utterly weary march all through the night of the 7th. Their short sleep at the end of it put off their next start until after noon of the 8th, when they had to get two big marches in, so we are told, before the 9th. He says no more about the second stage than he did about the first. On page 305 we read: "Hurried on again, Eskimos and dogs on the *qui vive*." Thus with neurotic alacrity another 32 miles (stat.) flash past, the four or five hours sleep they had obtained having worked wonders in improving their worn-out condition. But as this march must have taken until at least midnight of the 8th *how did they get in another 28¾ statute miles before the 9th*, when they had a further 51 miles to get in? Of their third stage we are told that it took all their will-power to do it, and that is the extent of the information we are given. *No one could have done it before the 9th*, which Peary clearly keeps for his last 51¾ miles.

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[1] In *all* Peary's accounts of his journey he skims as rapidly over his description of this crucial stage as he professes to have done over the ice. In his First Account he merely said: "Three marches brought us back to the igloos where the Captain turned back." *i.e.*, over the distance he had planned to cover in five outward marches of 25 miles each. Two of these three return marches were double marches of 50 geographical miles each, or 115 statute miles for the two double marches, and 147 for the three. The distance, by the latitudes, was two or three miles further, and this makes no allowances for twisting off the course. *The actual distance sledged must have been fully 150 statute miles.*

These first three stages of the return total 97.8 English statute miles. From the information at the disposal of the present writer it would appear that the world's record for walking 100 miles was won by A. W. Sinclair of the North London Athletic Club in 1881, and up to 1905 was not beaten. Unless it was beaten in the next four years the time for this event, when Peary challenged it, stood at 19 hours 41 minutes 50 seconds. This was accomplished in an ordinary race and under racing conditions in about 51° 30′ north latitude. Peary's time, for two miles short of this distance, was something, we are not told how much, less than 27 hours; but it was done, if at all, under Arctic travelling conditions, clad in heavy furs, between latitudes 88° and 90° north, over abominable surfaces of ice and snow, and merely as an incident in many hundreds of miles of sledging. The Indian Dak runners are justly renowned for their speed, and Sir Aurel Stein gives one of their feats which came under his notice.[1]

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[1] "Sand-buried Ruins of Kotan," page 48.

Yet this Hunza runner took 8 days to cover 280 miles, or an average of *only* 35 miles a day. This, it must be remembered, is duly authenticated, which many claims to higher speeds are not. The only true comparison, however, is that of other sledging speeds.

### COMPARISON WITH OTHER SLEDGING SPEEDS.

It was said at the outset that Peary's final court of judgment would be composed of his Arctic peers. Two further observations must now be made in order that this assize may be properly constituted to pronounce its verdict: firstly, that only one other civilised man, beside Peary, has ever claimed to have been within about 200 miles of the Pole; and secondly, that these two, though personally antagonistic to each other, agree in saying that the ice nearer the Pole is more level than it is further south. This other individual is Dr. Frederick A. Cook.

The North Polar controversy is beside our immediate purpose, but it is impossible to omit all reference to Dr. Cook if our information is to be complete. He is mentioned here for three reasons: first, because his description of the unknown conditions beyond about latitude 87° N. was received by the world before Peary's account, which verified Cook's; secondly, because Cook asks us to believe nothing incredible; and, lastly, because his expedition is the only perfect parallel to Peary's. Cook and Peary agree that the sledging conditions immediately around the Pole are better than further south, and no one else has ever been in the polar area.

The newspaper settlement of the controversy in 1909 cannot possibly be accepted as final, for the simple reason that the polar explorers, who are the ultimate authorities, have never agreed with it. All we can do, pending the full, scientific examination which the subject demands, is to take both the American stories as they stand and make the best of them. The silly newspaper scare at the time excluded two quite reasonable alternatives to either Peary or Cook being an imposter. Both the claims may be more or less true, or both false. Broadly speaking, Mr. Balch takes the former view and the British explorers take the latter. Possibly this paper may be a very modest contribution towards the final elucidation of the matter.

In 1908, the year before Peary's last journey, Dr. Cook set off on his daring, and perhaps reckless, trip to the Pole. The first half of his route has been verified by Dr. MacMillan, so that there is no precedent, as far as that may go, for doubting his statements as to the other half, which now concerns us. The length of his journey over the Arctic Ocean was 546 miles, or 125 miles longer than Peary's route across the pack. The ice to the north of Axel Heiberg Land, from whence Cook started, is not so much pressed up as on Peary's route. This has been proved also by MacMillan. Cook took 34 marches in 35 days from the land to the polar area, keeping a very steady pace the whole way, on and off his average of 16 miles a march. This speed was considered to be impossible until Peary claimed to have exceeded it.

We now return to the subject of the improved surfaces near the Pole, which necessitated the reference to Dr. Cook. Peary agreed with Cook's prior discovery that from latitude 87° or 88° N. the ice was less disturbed than it was in lower latitudes, so that higher speeds were possible. But it must not be supposed that, in consequence of this, the surface of the pack near the Pole in any way resembles a skating-rink. They both make it clear that the difference in the state of the ice from that further south is not in kind but in degree. The ice-fields are larger and less pressed-up into ridges, but the photographs and descriptions of both the explorers are decisive that the obstacles to progress in this circumpolar region, although reduced, are far from being entirely removed. The improvement began at about latitude 87° N. on both the outward journeys, but a little north of this Cook discovered his glacial island, so that the true polar conditions are not reached, on his route, until the 88th parallel. If we compare Cook's rate of progress to the north of this glacial island with that to the south of it we get a fair measure of the difference in the going. Between the 83rd and the 87th parallels his average was about 13½ miles per march, and his three best days were of 18 miles; between 88° anl 90° N. his average was 15½ miles per march with one day of 23 miles. Thus the better surface gave about two miles a day, or, roughly, 15 per cent., improvement, which is about what we should expect.

When Peary comes to the circumpolar conditions his speed increases, not 15 per cent., nor a little more, which would be quite possible, but about 115 per cent. If we compare his last seven marches, from where the change occurs, with his average up to there, we find that his speed jumps up from 11 to 24 miles per day. If we take the eight days he was north of Bartlett's last camp, with his travelling at the Pole, we find his average to be 37 miles per day, or 300 per cent. faster than before. The first two days of his return from the Pole were 500 per cent. faster, and that dies mirabilis, April 7th, was no less than 800 per cent. above his average when he had his staff with him. What will the Arctic Assize say to this?

We have toiled, somewhat laboriously perhaps, through the polar archives in order that Admiral Peary may receive the fullest and fairest consideration; but there are still a few other witnesses to be called, though they will not detain us much longer. There is Captain Mikkelsen, who with Mr. Leffingwell travelled 200 miles over the Arctic pack. Their average rate was 6½ miles per march, or slightly below that of other explorers. This was due to the ice they traversed being more disturbed than usual; they were able to cover 25 miles in a day when the surface was more level. Last of all, Dr. MacMillan, of Peary's own staff in 1909, traversed 150 miles of the ice-pack near Cook's route. Here the pressure is relatively less, so that an average rate of 16½ miles per march was attained, this being almost exactly the speed of Cook.

There are three Antarctic authorities of greater weight than most of the witnesses hitherto heard, and whose evidence has a direct, if a circumscribed, bearing on the problem. They inform us what distances, marched on frozen surfaces and in polar kit, are near the limit of human endurance. Sir Ernest Shackleton walked nearly 30 miles per day for four days, to the relief of Marshall, at the very time when Peary was starting in 1909. Had Shackleton been able to do more than this he would have done more. How many men could have walked further, under polar conditions, than Shackleton in his prime? Perhaps none. Peary, at the age of 53, was not likely to have done *three times as much.*

Captain Scott, in his "Discovery" days, marched 29 miles a day for three days; and on another occasion, after covering 50 miles in two days over sea-ice, writes: "Considering the excessive cold and our heavily-clad and ice-encumbered condition, it was certainly worthy of note."[1] Such evidence cannot be lightly brushed aside. These were the longest marches ever made by two greater men than Peary, and they could not have done much, if any, more.

Thirdly, we come to Captain Amundsen, undisputed conqueror of the South Pole, and at this moment struggling with the Arctic pack. He writes:[2] "If Peary could make a record trip on the Arctic ice with dogs, we ought surely, with equally good tackle, to be able to beat Peary's record on the splendidly even surface of the Barrier." Note the distinction he makes between the excellent sledging conditions he found in the Antarctic and the bad conditions which Peary encountered. Yet what did Amundsen accomplish? His fastest run was across the Barrier on his return from the Pole, a distance of 510 miles, at 25½ miles per day; but Peary says he beat this with 585 miles, from Bartlett's last camp to the North Pole and back to land, at 27.8 miles per march; and he eclipses Amundsen's speed by his 400-mile return from the Pole at 28 miles per march. We may grant that the Norwegians might conceivably have done more, but then *Peary may certainly have done less.* Amundsen's record for a short distance was 105, against Peary's 150 miles, in two days; and a pitiful 62 against Peary's magnificent 97.8 miles in only one day. The Norwegian equipment was superior to Peary's, for his Eskimos drove in that unscientific Greenland style, with the dogs on the wings of the team pulling against each other; whereas Amundsen had adopted the double tandem system, which gives a direct pull for the whole team. Furthermore, *the Norwegians rode, while Peary walked.* Amundsen was as efficient a sledge-traveller as Peary, and he had better conditions, yet we are asked to believe that Peary could *walk* 35 miles more in one day, and 45 miles more in two days, over a much rougher surface, than Amundsen could *ride.*

The only time that Peary mentions riding upon a sledge is on the first day of his final spurt to the Pole, when he says:[3] "The dogs were so active . . . . that I was frequently obliged to sit on a sledge for a few minutes or else run to keep up with them." That this was most exceptional his general statements amply show, as on pages 193-194, where we read : "Many persons . . . . picture the Arctic Ocean . . . . with a level floor over which the dogs drag us merrily—we sitting comfortably upon the sledges with hot bricks to keep our toes and fingers warm. Such ideas are distinctly different from the truth, as will appear." Again, on page 251 : "Those who have pictured us sitting comfortably on our sledges, riding over hundreds of miles of ice as smooth as a skating pond, should have seen us lifting and tugging at our 500 lb. sledges adding our strength to that of our dogs."

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[1] "Voyage of the 'Discovery.'" Vol. 2, page 209.
[2] "The South Pole," Vol. 1, page 57.
[3] "The North Pole," page 276.

The longest *authenticated* distances ever walked in the polar regions in one day, in addition to those just mentioned, are as follows : Hanssen and Bjaaland with a team of dogs covered about 50 miles on January 2nd, 1912, when returning with Amundsen from the South Pole; Wisting, Hassell and again Bjaaland went 43½ miles at the Pole in one day. Both these feats were performed *on ski*. Without ski, Bage, Hurley and Webb, Sir Douglas Mawson's magnetic Pole party, marched 41.6 miles in one day on their return journey. The surfaces over which Peary travelled were not any better than those over which these great marches were made, and Peary could not pretend to surpass these men in physical strength and fitness. There seems, therefore, no need to collect further evidence.[1] We can affirm with much truth that the Polar Court has been assembled and is now in full session. There is no doubt as to its verdict, which the schedule clearly shows.

SCHEDULE OF JOURNEYS OVER THE ARCTIC OCEAN.

| Year. | Explorer. | Circumstances. | Distance. Miles Geo. | Av. speed. Miles stat. p. march. |
|---|---|---|---|---|
| 1895. | Nansen. | Journey to 86° 14′ N. ... | 165 | 8.1 |
| | „ | Whole journey to 82°21′N. | 486 | 7.9 |
| 1900. | Cagni. | Main part of journey ... | 665 | 14.3 |
| | „ | Best continuous marches | 372 | 17.8 |
| 1902. | Peary. | Journey to 84° 17′ N. ... | 87 | 7 |
| 1906. | „ | Journey to 87° 6′ N. ... | 251 | 8.4 |
| 1907. | Mikkelsen. | In Beaufort Sea ... ... | 299 | 7.4 |
| 1908. | Cook. | Heiberg Land to Pole ... | 546 | 18.4 |
| | „ | Return from Heiberg Land to Pole ... ... ... | 566 | 14.3 |

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[1] Since the above was written information has been received of great distance more recently covered by Dr. Stefansson and Mr. Rasmussen.

| | | | | |
|---|---|---|---|---|
| 1909. | Peary. | Cape to Columbia to 87° 47′N. ... ... ... | 289 | 14.3 |
| | „ | 87° 47′ to Pole ... ... | 130 | 29 |
| | „ | Pole to 87° 47′ N. ... ... | 130 | 74.81 |
| | „ | Pole to 88° 32′ N. (Dies mirab.) ... ... ... | 85 | 97.835 |
| | „ | 87° 47′ to Cape Columbia | 289 | 25.5 |
| | „ | Whole outward journey | 419 | 16.9 |
| | „ | Whole return journey ... | 419 | 32 |
| | „ | Whole journey ... ... | 874 | 22.8 |
| | „ | 87° 47′ N. to Pole and return ... ... ... | 585 | 31.97 |
| | „ | Average of 1902, 1906 and 1909 to 87° 47′ N. ... | | 9.7 |
| 1914. | MacMillian. | In search of Crocker Land | 150 | 19.2 |

It is evident that Peary's speeds on all his journeys over the pack-ice up to Bartlett's return in 1909, which averaged 9.7 statute miles per march, were quite normal to those of other explorers. The best of these performances was 14.3 miles per march for 289 miles, and this did not equal Cagni's 17.8 for 372. When Peary returned from his last journey he said that, after leaving Bartlett, he averaged nearly 32 miles per march for the last 585 miles, and including the performance of all the prodigies already mentioned, but over which he partly draws a veil. 32 miles per march is more than three times his previous average, and he says that he kept it up for a much longer distance than any former journey he had made on the Arctic Ocean. It is a very great, as well as a very sudden, increase.

When Peary first attacked the polar pack he found the sledging conditions so terrible that he was ashamed to acknowledge how little progress he was able to make. He had travelled, on better surfaces, as much as 90 miles in 24 hours; but on the pack-ice his daily marches seemed so ridiculously short that he seldom lets us know how few miles he made, until his last journey, by when he had learnt how best to overcome the difficulties. Even in 1909 he omits to give his mileage on quite a number of days, three of which turn out to have averaged about eleven miles, and four others only half that distance. Polar explorers can understand all this: they can understand also that there may be exceptional days when distances up to about 30 miles are covered. But there is not one, of all Peary's fellow explorers, whose experience has produced anything that will enable him to comprehend these claims to have sledged distances up to 98 miles in one day over that arduous surface.[1]

No other traveller on the Arctic pack has ever made a claim that even remotely approaches Peary's extraordinary speed. The contention is not that all his highest speeds would be impossible under any circumstances, for on the best sledging surfaces, and under different conditions to his, speeds as great as Peary's have occasionally been reached. But the Arctic Ocean has one of the worst sledging surfaces yet known to man, and although somewhat smoother near the Pole, even there it is very rough. Peary writes,[2] "What we regarded as a level surface on the polar ice might be considered decidedly rough going anywhere else," and he states that he had "no smooth and very little level ice."[3] Above all, in this comparison, it must be remembered that when 90 or 100 miles have been driven in 24 hours in other places the drivers rode on the sledges, whereas Peary had to walk, and had not the use of ski. The contention is that under the circumstances which are known to have existed, and those which Peary himself describes, 97.8 miles in one day was absolutely impossible.

In 1906 he had made the world's record for speed and distance over the pack. This was one degree of latitude in two days, if we can accept that somewhat dubious statement, performed at the rate of about three miles per hour. He slightly exceeded this distance on the last day of his final spurt to the Pole in 1909, according to his account, by covering 32 geographical miles, but at a rather lower speed. Suddenly he nearly trebles his own world's record, although that was hardly above suspicion. Any such distance is absolutely unprecedented in the whole history of polar travel, and is only really comparable to the world's walking record which was made in a few ounces of clothing. But now comes the deepest part of the mystery, if mystery it be: *Peary carefully abstains from mentioning a word as to the portentous distance he has done!*

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[1] In Authority No. 5, page 106, the speeds of Peary and Cook are correctly noted, and a pointed reference is made to Peary's claim to have covered 132 geographical miles in three marches. Yet no one dared to question his ability to have travelled 50 statute miles a day for three consecutive days.

[2] "The North Pole," page 243.

[3] *Ibid.*, page 194.

Consider what this means. In all his earlier writings he had given great prominence to the speeds and distances he had attained on his marches, whenever they were good. He always took the greatest pride in a long march and a quick journey. It was one of his forms of sport, and was most commendable, except for his tendency to exaggerate his exploits, and for his uniform rule of suppressing his poor performances. With pardonable pride he expatiates upon his 30 miles a day in 1906, pardonable, that is, if he did it. Why then does he not point out how, in 1909, he marched, or ran, thrice that distance in the same time? He actually leaves us to find out his mileage from the latitudes, no difficult matter, *but one the general public could not do.* Is not this a peculiar, not to say a suspicious, circumstance? Everyone knows that it was not one of Peary's failings to hide his light under a bushel. His silence, therefore, is a positive portent. He must have had some very good reason for suppressing all reference to this new world's record, as such a thing is absolutely unique in all his writings. It was foreign to his nature. He always suppressed his short marches, but this is the only occasion when he has suppressed his mileage because it is too great. We cannot credit the exception.

One other aspect of the subject requires more attention than it has received hitherto. The attempt made in the course of this paper to compile a connected and credible account of Peary's return from the Pole to latitude 87° 47′ N. out of his own materials, credits men and dogs with powers which, from his own statements, they were most unlikely to have possessed at the time; yet, although the speed assumed was the highest he had ever maintained, it left 45 geographical miles which could not have been done in the time recorded. He exerted his party to the utmost on the final spurt, when he writes of their freshness and energy; yet they could not exceed 2½ miles an hour then, and he admits that, in three marches, they were getting played out by that speed. He often mentions their exhaustion when in the polar area, *yet his claim to have attained the Pole rests upon our belief that they could travel incomparably faster when they were exhausted than when they were fresh.* Peary tells us that on the return they covered the same distance in two days instead of five, which means an average of 65 miles a day when exhausted and 26 when fresh. On page 285 he complains of " the physical exhaustion of the forced marches of the last five days," at only 26 miles a day; then, with an incredibly small amount of sleep, they travel 36 miles about the Pole and set out on their miraculous journey. Their speed actually increases with their advancing weakness. Peary had never dreamed, in his wildest visions, that he would ever travel more than 90 miles in a day over the polar pack; yet, after insisting on the difficulty with which they had averaged 26 miles a day during the final spurt, and, having made us thoroughly aware of the exhausted state of his whole outfit, he coolly expects us to believe this story.

Peary gives the total number of his return marches as 16, whereas only 15 can be found. The difference is probably due to his making the first 130 miles into three marches, which may look quite feasible on the surface, averaging 43 miles a march; but this is not in accordance with the facts. From 4 p.m. on April 7th to the evening of the 9th is a few hours more than two days. If the first of these days must be reckoned separately the 26 miles which Peary travelled on that day about the Pole must be added to the first 32 miles of his return. But even this would not be correct, for days are not always calculated from midnight to midnight where there is continual sunshine. From April 3rd to 8th (inclusive) Peary's work carried him, on each march, into parts of two days, as shown on the schedules.[1] His actual mileage, therefore, according to this system of computation, on April 6-7th, 7-8th and 9th, was respectively 36, 85 and 45 geographical, or 41.4, 97.8 and 51.7 statute, miles. These figures average 63.6 statute miles a day. If the last day of the final spurt be included, when 36.8 statute miles were covered, the average for the four days comes out at 56.9 miles a day. The credibility of the story is not particularly enhanced by this arrangement.

Those who attempt to schedule Peary's outward and return marches on one sheet, as Captain Scott's Barrier journeys have been set out at the end of his "Last Expediton," will find the greatest difficulty in making them agree. Peary attributed the high speed of his return to being able to retrace his outward trail. This is not the least of the many marvels that we are expected to receive with unquestioning faith. The main drift of the pack was at right angles to his course, and the ice had never before been known to remain inactive for more than a day or two at a time. In fact, it is eternally in motion, as a whole, so that he must have returned to the land-ice some miles to the east of his point of departure unless he broke a new trail for most of the distance. Furthermore, the sides of open leads have usually been observed to have relative motion. Were there *none* which formed behind him during his absence in the north? Peary appears to have been a modern Joshua, who commanded the pack to stand still for over a month while he conquered the Pole.

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[1] See Schedules on pp. 113 and 128.

The storm on the second day of his return was most likely to have dislocated his trail, so that his own explanation of his quick return fits in much better with the difference we find in the two journeys than with the high speeds. The average distance per day from Bartlett's last camp to Cape Columbia appears to have been 21.4 miles, which is a very big drop from the phenomenal marches of the first two or three days when he was beyond Bartlett's farthest. Moreover, the change does not come gradually, as from weariness, but with almost dramatic suddenness. These are the figures: 85 and 45 miles a day from the Pole to 87° 47′ N. Then the following daily marches, 20, 32, 27, 20, 15, 30, 25, 17, 22, 24 and 12. The last two days are not given, but they must have averaged 22½ miles each. This is another peculiar circumstance. These marches total 419 miles. Peary gives 413 miles as his distance, which is fairly near.

Peary's story contains other inconsistencies, one example of which must be given. On the outward journey he evidently did not travel on March 14th, though nothing is said about it, nor is any distance given for the 15th, 16th, 17th or 18th. It is evident from these omissions that things were going badly, for Peary always suppresses his bad days, as we have seen. On this occasion it was through Henson's bad pioneering that he only marched, on an average, 5½ miles on each of these four days. The foregoing is what happened according to the letter of the book. Let us, however, look into this closely. If we turn to page 237 we find Peary gives the date as Monday, March 15th. On page 240, "In the morning" must be that of the 16th, and the "next march" to the 16th is the 17th. On page 241, "After a short sleep" might bring them to the 18th, or it might still be the 17th. But after telling us of Marvin's good march of 17 miles he says distinctly: "At the end of this march *on the evening of the*

*19th.*" Thus an inconvenient day has been unceremoniously consigned to oblivion. So much for what he says; but if we *assume* that on page 241 the date 19th is an error, and that it should read "18th," the account will fit in very well. For after speaking of the evening, on the next page he writes of the 19th as if he had not mentioned it before. Page 143 seems to confirm this hypothesis, for there he says that they did 15 miles, whereas on page 241 he had already told us that they did 17 miles on that day.

This seems to be a clear case of what critics term composite authorship: that two different people have written the original accounts from which our present version has been compiled by a third and much later hand. We are told that on the 19th of March they travelled both 17 and 15 miles, and the 18th is not mentioned. If, however, we may so far presume as to tamper with the text in the manner suggested, we may assume that they did 17 miles on the 18th and 15 on the 19th. This would increase the average on the 15th, 16th and 17th, on which days no distances are given, from 5½ to 7⅓ miles a day. Unfortunately this hypothesis leaves one day too many, which a twelve hours' rest will not account for, so confusion must remain the worse confounded. Another and similar example will be found on pages 247 and 252, the details of which would be tedious.

Can polar explorers explain the apparent inconsistency of the following?[1] April 9th, we are told, was a wild day. "All day long the wind blew strong from north north-east, increasing finally to a gale," from which, as we should expect, "all the leads . . . . were greatly widened and new ones had been formed." Then follows the startling news that "We struck one just north of the 88th parallel which was at least a mile wide, but *fortunately it was all covered with practicable young ice.*" (The italics are ours.) Peary adds, "For the last half of this march the ice was raftering all about us and beneath our very feet under the pressure of the howling gale,[2] yet a mile of young ice had not been broken up. Peary cannot have it both ways. Either there was no high velocity wind or there was no thin ice over which the lead was crossed.

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[1] The writer did not anticipate a reply to this question before going to press, but Mr. R. W. James believes, from his experience in the Weddell Sea, that what Peary records *might* be *possible*.

[2] "The North Pole," page 305.

PEARY'S STATEMENTS AS TO SLEEP.

| Date. | Miles. | Hours in camp. | Amount of sleep. |
|---|---|---|---|
| April 2 | 25 | 12 to 15 | "A few hours." |
| „ 3 | 20 | 11 to 13 | "A few hours." |
| „ 3-4 | 25 | About 12 | "A short sleep." |
| „ 4-5 | 28 | 13 to 14 | "A little more sleep." |
| „ 5-6 | 32 to Camp Jesup. | | "A few hours" (less than 6). |
| „ 6-7 | 36 round about the Pole. | | (NONE). |
| „ 7-8 | 85 | 6 (assumed) | "A few hours." |
| „ 9 | 45 | 9 (assumed) | "Asleep almost before . . . finished . . supper." |

Let us turn to the shortage of sleep. From April 2nd to 5th inclusive a very large proportion, as much as one-third, of each day is unaccounted for, which will be seen by a glance at the schedule. This is not an argument from silence, but from want of sleep when there was ample time for it. On the first four days they only travelled ten, and on one day eleven, hours out of the 24. Thus 13 or 14 hours are left. They started an hour or so earlier each day to arrive at the Pole for a noon observation. Even then 12 or 13 hours each day were left for rest. Yet we are told that they only had time for a few hours sleep at each camp. The Eskimos took about an hour to build the igloo, during which time Henson would unpack the sledges and feed the dogs. This leaves 11 hours on one day and twelve hours on the other days for rest. Six hours might be a fairly normal sleep, but Peary persistently represents that they had insufficient. We must assume, therefore, that they were only getting about four hours sleep a day. *In this case seven or even eight hours at each camp are unaccounted for,* when they were actually of the greatest value. They might have been spent either in marching longer, or in getting more sleep, which would have given them more strength. It is no reply to say that "a few hours sleep" is merely a phrase for their normal ration of rest, because the whole account is quite consistent with a serious shortage of sleep and its consequent exhaustion—*until the miraculous march begins on the 7th, when it is completely forgotten!* Peary distinctly states that they were getting run down for want of sleep while they had plenty of time for a surfeit of it. Mistakes of this kind are common in writings of fiction, but I have never observed anything like this in the journal of any other exlorer.

Even Mr. Balch, who can see no evil in anyone, happy man, admits that the " text is somewhat involved." This is precisely the difficulty in which Peary has left posterity to flounder. The text of his narrative is so frequently and so deeply involved that history must record his exploits with a very dubious hand. He can be judged only by what he has himself presented to the world. His claim to have reached the Pole is based upon his own unsupported word and his own unchecked observations. There is no other data. The credibility of his word has been examined. His book, which should have been a scientific record of carefully ascertained facts, is in some parts ambiguous and in other parts contradictory. Some of his statements are so incredible that they could not be accepted unless they were supported by the clearest and most undoubted proof. Such proof Peary decided should never be forthcoming by deliberately refusing to have another white man with him beyond latitude 87° 47′ N. This geographical point was fully verified by Captain Bartlett, who was a skilled navigator. But Bartlett was not only a navigator, he was also by far the best of all the pioneers on Peary's staff, and this fact completely disposes of the reasons which Peary professes to give for taking Henson on the final spurt. Henson was vastly inferior to Bartlett as a sledge-driver, and he was no better than the Eskimos in other ways, except for personal attendance upon his master. By his own choice, therefore, Peary has left us with nothing whatever beyond his own unsupported word and observations.

In concluding this part of the subject one slight circumstance in Peary's favour remains to be mentioned. The strong north wind that was blowing on April 9th would tend to drift the pack in the direction he was taking and so add to his mileage. No allusion has been made to this hitherto because on this day he marched only 52 statute miles, and so it is no help whatever in trying to account for the 98 miles of the day before. But we may inquire briefly how much benefit the following wind of the 9th could confer. Dr. Nansen undoubtedly is our greatest authority on the drift of the Arctic ice. His northward movement in the Fram was usually at the rate of one or two miles a day. He became jubilant when a distance of 13 minutes was covered in 6 days,[1] which extended to 15 minutes in 8 days. Occasionally we find as much as four miles a day recorded,[2] and once "about five minutes a day."[3] Sverdrup does not appear to give any daily records of the southerly drift, which was probably about the same as the above. It is very doubtful if Peary's advance was accelerated by more than five miles. If it was this would reduce the actual marching distance on that day from 52 to 47 miles.

In Peary's lecture at the Albert Hall he summoned this storm as his ally in covering the extraordinary distance that he claimed, saying, "perhaps without it we would not have reached Bartlett's igloos, as the force of the wind helped us along." Most certainly it would, although it would also have driven them a little off their course as it came from the N.N.E., and it could not have left a mile of young ice unbroken. But if it was strong enough to blow them forwards more than, say, from 5 to 10 miles extra distance, the sledges would have over-run the dogs. This has often happened to others, and must be so if the wind is of sufficient velocity to add many miles to their credit. We are distinctly told, however, that "As it was the dogs scudded before the wind much of the time on the gallop." In any case there was no wind to help out the 98 (stat.) miles of the previous day.

## III.—Peary's Credentials.

It is submitted that the facts which we have considered have established this: that Peary insisted on preventing all demonstration of the truth of his assertions, yet some of them are confused and almost fabulous. It is therefore necessary to ascertain what value can be placed upon his unsupported statements, by testing his reliability in other fields. He travelled widely, and has been followed by others on whom we can rely. What credentials can he present from his many years of exploration?

In 1892 he made his first great journey across the Inland Ice of Greenland. It has been proved that he reached the neighbourhood of Navy Cliff, for his record was found by

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[1] "Farthest North," Vol. ii. page 53.

[2] *Ibid.*, Vol. i, pages 265, 393.

[3] *Ibid.* Vol. i, p. 268.

Erichsen:[1] but all the grandiloquent claims of discovery that he made on his return have now been completely "washed out." These were four in number: (1) Independence Bay, which he said was on the Polar Ocean; (2) The Peary Channel, which insulated the northern part of Greenland; (3) The north-east coast of that country; and (4) The establishment of its insularity.

As to the first of these, the Danish expedition of 1906 found that the ocean could not be seen from where Peary stood, as it is over 100 miles away and hidden by Mylius Erichsen Land. Navy Cliff is at the head of a very long and narrow fjord, and there is no Independence Bay, nor any other possible bay within 100 miles of Peary's view-point. His second great "discovery" was the so-called "Peary Channel." Erichsen, Mikkelsen and Rasmussen, in the course of several expeditions, since Peary's time, have amply disproved its existence. Mr. Rasmussen's labours in Northern Greenland have made him our latest authority upon this district. He was a great admirer of Peary, yet in his recent book, "Greenland by the Polar Sea," he tells us as often as three times how he disproved the existence of the Peary Channel, as well as other claims that Peary made. He says:[2] "On the first Thule expedition in 1912 . . . . we established that the channel which Robert E. Peary thought he had discovered between Independence Fjord on the north-east side and Nordenskjold Inlet on the north-west was non-existent." Again on page 154 he says: "The whole of the big Peary Channel had been reduced to a myth." On the next page he writes: "Peary had also come to wrong conclusions with regard to places like Nordenskjold Fjord and de Long Fjord not to mention Independence Fjord." The subject is referred to once more on page 165 where Rasmussen writes: "Erichsen, Hagen and Bronland were the first men to view the head of the fjord which overthrew the whole theory of the Peary Channel." Captain Mikkelsen, in his account of the Danish expedition of 1909—1912, states how he recovered the message of these three heroes, which contained these words: "We drove westward with 23 dogs, until the 1st of June, reaching

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[1] See Maps of North-East Greenland. at end. The position of Peary's cairn at Navy Cliff is shown by a dot within a circle. His farthest east on the North Coast is marked with a cross.

[2] Page xviii, Introduction.

Peary's Cape Glacier, and discovered that the Peary Channel *does not exist.*" The italics were Erichsen's. He continues: "Navy Cliff being connected by land with Heilprin Land, we re-christened Independence Bay, calling it Independence Fjord."[1] The non-existence of the Peary Channel upset Mikkelsen's plans, as he had intended returning through it, and this nearly cost the life of himself and his companion, Iversen.

Peary undoubtedly made long sledge journeys over the ice-cap of Greenland, but they accomplished nothing of geographical importance. Even on his first trip with Astrup there was far too much "hustle," though it must be admitted that they were in a somewhat precarious position as regards food. Careful geographical work could not be done under these circumstances. His second journey in 1895 was a sheer gamble with life. It is a thrilling story of fighting for existence and racing against death. It was almost a miracle that they got back, they had then only one dog left and no other food. Geographical work was naturally out of the question. Apart from its heroism it was a futile journey, nothing whatever being added to what he had previously done.

Peary's third and fourth claims may be taken together. He said he had discovered the eastern limits of Greenland, and proved its insularity; but it was impossible for him to have done either from the locality he reached on his journeys across the Inland Ice. He may have known this, for in the year 1900 he travelled round the north coast, and discovered about 150 miles of new land past Lockwood's farthest. On this journey Peary nearly proved the insularity of Greenland, though he never completed, as he claimed to have done, the circumambulation of its northern portion. After passing a point which he named Cape Bridgman, he turned back in latitude 82° 57′ N. and longitude 23° 9′ W., which he said was the easternmost point. But Koch in 1907 found that the most easterly point of Greenland was no less than 93 miles further south, and nearly as much east, of Peary's farthest, its position being 81° 24′ N. and 12° W. Koch pushed on past Peary's cairn, which he found, and as far as Cape Bridgman. Thus it was he, and not Peary, who had completed the delineation of Greenland, and Peary has been proved an unreliable chronicler of his own deeds. But turn to another field of his labours.

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[1] "Lost in the Arctic" (Heinemann, 1913), page 192.

Dr. Donald B. MacMillan was both an assistant and an ardent admirer of Peary. He had been with him on his last expedition. In 1914, with an excellent staff, he set out for the purpose of exploring and surveying a new land that Peary said he had seen in 1906. MacMillan tells us in his book, "Four Years in the White North,"[1] that he felt this new land was a goal worthy of ambition, for it was situated on the edge of the *second* largest unexplored area in the world. Dr. MacMillan forgets that unexplored Antarctica is twice the size, and refers to the unknown space in the Arctic as the most extensive of its kind.[2] Peary had named the new country "Crocker Land." He reported its position to be to the north-west of Axel Heiberg and Grant Lands. MacMillan and his party went 30 miles beyond where its coast was shown on Peary's maps, but *no land was found*. MacMillan writes, on page 82, that Peary "had left his discovery for younger men to prove or disprove; this we had done. If Admiral Peary did see land due north-west from Cape Thomas Hubbard then we had moved it at least 200 miles from shore. To see land at a distance of 200 miles from where Peary stood the land must reach an altitude of more than 30,000 feet. Such an altitude in that latitude and longitude is contrary to all scientific reasoning." To show how eagerly Dr. MacMillian wished his result had been otherwise he begins his fifth chapter with these words: "My dreams of the last four years were merely dreams; my hopes had ended in bitter disappointment." This is another instance of Peary's liability to error. Subsequent exploration has not enhanced his prestige, nor the credibility of his word. His map of north-east Greenland is most inaccurate, whereas the Danish map has been accepted by our geographical authorities. Peary's charting has not even the appearance of having been surveyed; it looks as if it had been merely sketched in, and is now discarded. Most of his alleged discoveries have therefore been wiped out. His word cannot be trusted. *Such credentials as these cannot support his bare assertion that he attained the Pole by travelling 98 miles in one day.*

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[1] First page of Introduction.

[2] How, also, could Peary be misquoted by saying "widely-distant capes"? MacMillan makes one of them Cape Columbia instead of Cape Colgate. See "Nearest the Pole," pages 202 and 207.

### PEARY'S EXAGGERATIONS.

One suggested explanation of Peary's extraordinary statements is that he possessed a genius for exaggeration. He certainly had no ordinary powers in this direction, but it is not clear how this will help, for he could not have got back from the Pole, according to his own dates and latitudes, if he he had done less than 150 miles in two days. Let us, however, consider the evidence of exaggeration on one point alone.

It is not without interest to find the same man who marched such tremendous distances to be also the man who has been obliged to negotiate the Brobdingnagian pressure ridges which Peary found across his path. On the first day of his final spurt, or north of latitude 87° 47′, he reported some ridges 50 feet high.[1] We may be certain that he had no time to measure them, so they *may* have been about 30 or 40 feet in height. Even this size is unprecedented so far from land, but there is no doubt that the roughest routes to the Pole are just where Peary made his attempts. On his return from his 1902 polar journey from Cape Hecla he writes: "Our tracks now disappeared under a huge pressure-ridge, which I estimated to be from 75 to 100 feet high."[2] There have been many others in this locality since then; it was a little south of latitude 84° 17′ N. on his route, and about 100 miles from land, but nothing like this monster has ever been seen again. Peary had not exerted his wonderful descriptive powers to the utmost, however, for after his famous crossing of the Big Lead in 1906 he found its southern shore, at about 70 miles from land, "a hell of shattered ice . . . . from the size of paving-stones to *literally and without exaggeration the dome of the Capitol*." (The italics are ours.) This stately pile is no less than 285 feet high, but had Peary been charged with exaggeration in spite of his denial of it he had the obvious reply that he said "the dome" and not the whole building. It is not unusual, in his writings, to be uncertain of his meaning; but if we are to judge, as we are obliged to judge, by the concensus of evidence from all other polar explorers, we shall come to the conclusion that Peary made his minnows into whales.

No one else has ever seen floating pack-ice pressed up much more than one-tenth of the height that Peary says he

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1. "The North Pole," page 275.
2. "Nearest the Pole," page 345.

saw it. Dr. Nansen, whose word can be trusted, writes :[1] " In the accounts of Arctic expeditions one often reads descriptions of pressure-ridges or pressure-hummocks as high as 50 feet. These are fairy tales. The authors of such fantastic descriptions cannot have taken the trouble to measure. During the whole period of our drifting and of our travels over the ice-fields in the far north, I only once saw a hummock of a greater height than 23 feet." In a footnote he adds that higher " hummocks might be formed by violent pressure against land or something resembling it. After our experience, however, I cannot believe in the possibility of their occurring in the open sea."

Mr. Stefansson devotes a page of his recent book[2] to this subject. He is pleased to belittle Dr. Nansen's experience as being " of a particular and limited sort." Nansen is amply supported against Stefansson, however, by Mr. J. M. Wordie of Sir Ernest Shackleton's 1914 expedition, who has made a special study of ice problems. The pressure of the ice in the Weddell Sea, judging from the experience of the " Endurance," would seem to be no less than that in the Arctic Ocean at a similar distance from land. Mr. Wordie, in his paper on " The Natural History of Pack-ice,"[3] writes : "A word may be said about the height of pressure-ridges, since there has always been a tendency to exaggerate this feature. During these 15 months in the Weddell Sea it was quite exceptional for any ridges to be as much as 15 to 20 feet high . . . . Accounts from the north have given the impression of extremely high pressure-ridges in the Arctic seas. All these accounts, when reliable, are found to be based on phenomena seen north of Baffin Bay and Robeson Channel, where the land offers considerable obstruction to the drifting ice, and possibly causes higher ridges than on the open sea."

Mr. Wordie points here to the crucial factor, contiguous land, which Mr. Stefansson, in the passage quoted, appears to have overlooked. Dr. Nansen clearly makes the same distinction, and is concerned solely, as we are now, with freely-floating ice. It is no undue assumption, surely, to suppose that Peary refers to this also. His 100-foot and 200-foot ridges were respectively 100 miles and 70 miles from land, as already

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1. " Farthest North," Vol. 1, page 241.
2. " The Friendly Arctic." page 514.
3. Transactions of the Royal Society of Edinburgh, Vol. lii, Part 4, No. 31.

stated, and he says nothing whatever about shoals in the vicinity. In 1909 he found 825 fathoms at a distance of 85 miles north of Cape Columbia, although it shallowed to 300 fathoms at 150 miles from land. If these mighty ridges could rest upon the sea-bottom they would be excluded from the present consideration, but Peary leads his readers to believe that he is dealing with floating ice. Stefansson, as a friend of Peary, supports him wherever he can, and speaks no less than five times of pressure 50 or 60 feet high, as well as one other reference to even higher ridges.

The first mention of pressure[1] is a general statement; and the second reference, on page 167, appears to be the same. On the following page Stefansson describes what he observed, but he did not measure the height of the ice. The 60-foot ridges referred to on page 223 were aground. On page 613 the present argument finds positive support, for Stefansson believed that he was in the neighbourhood of undiscovered land, north-north-west of Isachsen Land, as probably he was, when obliged to turn back. One of the evidences of land which he gives is the magnitude of the ice-disturbances, "which were far bigger than any previous ridges we had seen made out of old ice far at sea," and which he estimated at over 50 feet high. Although he reports the highest pressure on record, next to Peary, he might find those mighty ridges 100 miles north of Grant Land difficult to explain.

Stefansson's further reference to this phenomenon is on page 514. This appears to be somewhat ambiguous, if not misleading, as the impression seems to be conveyed that the ice spoken of was afloat. He measured its height and found it to be 78 feet above water level. This is the highest ridge ever measured. Its position was very near the north coast of Isachsen Land. The following day, when farther from land, the depth of the sea was found to be about 30 fathoms;[2] hence this huge hummock must have been aground, as it would require double this depth of water to enable it to float. The quotation Stefansson gives from Captain Sverdrup's "New Land," in support of pressure over 80 feet high, is quite misleading. The passage is not completely quoted. It continues: "I had never thought that ice could pile itself up in such a manner *far up on land*; and to this day I cannot

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1. "The Friendly Arctic," page 8.
2. Page 515.

understand how it came to pass. After the great pressure had taken place the entire mass of the drift-ice had gradually receded from the land. . . . ."[1] Sverdrup was on a coast, the west coast of Axel Heiberg Land, at the time, and about 150 miles across Crown Prince Gustav Sea from where Stefansson found his big ridge. All these great ridges rested on land. The photograph given opposite page 514 in Stefansson's book shows the difficulty of estimating the height of pressure from the productions of the camera, for the view is taken in such a manner that the ice looks fully twice the height it really is.

Cagni reported pressure 45 feet high in latitude 84° 30′ N. on his route, but he did not measure it. Mikkelsen and Leffingwell had to negotiate similar difficulties to those of Peary in the pressure cause by the pack against the north coast of Alaska. The former writes:[2] "We came to the highest pressure-ridges which we have yet seen. One of them was at least 35 feet high, and we had been able to see it for the last day and a half." The little photograph given of this, with human figures on the top, enables us to form a fairly correct estimate of its size. Peary gives larger photographs of his big stuff, but there is nothing to act as a scale, so it might be any height. Heavy pressure would be expected where Peary found it, but no reliable traveller has yet recorded having seen it afloat of the stupendous size of Antarctic shelf-ice, nor does it appear possible. To be 100 feet high the ice must be about 500 up to 600 feet thick. Mr. R. W. James has suggested that very big ridges might be formed against some coast, and then drift off. This seems quite possible.

Peary's exploits bear no faint resemblance to the "death" of his facetious countryman, who complained that it had been "grossly exaggerated." To tell us that he had to contend with ice-disturbance 70 miles from land "literally and without exaggeration" 280 feet in height is to make himself ridiculous. He may have found this out before publishing his last book, for in this he is content to affirm that the pressure on his route reached "a few rods" in height. This vague term may mean anything from three to about six rods, which would give a range of roughly 50 to 100 feet; but no photographs are reproduced in support of this.

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[1] Vol. 1, page 375.

[2] "Conquering the Arctic Ice." page 261. See also note on page 440.

It is necessary to lay some stress upon these matters because Peary has asked us to credit his unsupported word for all that happened beyond latitude 87° 47′ N. on his polar journey. In seeking to ascertain what value can be placed upon his assertions we find that he had previously claimed to have made geographical discoveries which had no existence, and to have performed exploits which are undoubtedly untrue. The conclusion forced upon one, therefore, is that Admiral Peary's statements are unreliable. It is serious, and most unpleasant, to feel obliged to doubt any man's word; and particularly so in the case of an explorer whom we have all admired for many years. It is making the soul-disturbing discovery that one's idol was but of clay; but when a narrative savours so strongly of Baron Munchausen what alternative have we? The facts which he has himself presented have been most carefully considered. A determined effort has been made to arrive at the truth, and if this leads us to the conclusion that Peary's claim to have attained even the "Traveller's Pole" is untenable we must not hesitate to say so. If his statements had been reasonable and credible, and we had not been asked to believe the impossible; if also his account had been fairly consistent, instead of one in which some of his statements contradict others, even his unsupported word would have been universally accepted; but his story is so full of jugglery and mystery that his mere affirmation seems unworthy of acceptance. We must now consider his observations.

## IV.—The Astronomical Observations.

Mr. Balch may well write that it is "of prime importance that Peary's astronomical observations are accepted as proving he reached the Travellers' North Pole." It will be said that they have been accepted, and this is true in a certain sense; but the position in that case comes to this: that his claim is based upon two sets of proofs, his narrative and his observations, *which contradict each other!* For, if Peary's book proves anything, it proves conclusively that he could not have got within about 50 miles of the Pole. If therefore his sights could prove absolutely that he reached his goal there would be a dilemma from which escape would appear to be impossible. *But his observations and instruments have never been examined by an unimpeachable authority,* and even if they had been so examined they could not have furnished scientific proof that he had covered the extra distance which is in dispute. Let us consider the latter subject first, or that of the polar observations.

There have been no less than four claimants for the two Poles. Dr. Cook and Admiral Peary in the north, Captain Amundsen and Captain Scott in the south. Thus we are placed in a strong position from which to examine any one of them, as we are able to apply the comparative method. All four accounts, in doing so, will be accepted at their face value, and will be considered, in the first place, in chronological order.

Dr. Frederick A. Cook claimed to have reached the North Pole on April 21, 1908, after a journey of 546 miles from the north cape of Axel Heiberg Land. He used a pedometer for his dead reckoning, but as he was accompanied by only two Eskimos he had no one to check his observations. Of these he took seven complete sets, one every six hours from local noon on the 21st to midnight on the 22nd. His first sight gave latitude 89° 59′ 45″, and his journal for that day recorded "Long. 97° W., Bar. 28.83, Temp. 37.7,[1] Clouds Alt. St. 1, Wind 1 Mag. S., Iceblink E., Water sky W." In giving his corrections for instrumental error he points out that the corrections for refraction and ice-drift are not known. He shrewdly observes also that "the value of all such observations as proof of a polar success . . . . is open to such interpretation as the future may determine."[2] The altitude of the sun was on and off 12°, and a six-foot pole gave a 28-foot shadow for 24 hours, which agrees with this altitude. He moved camp four miles towards the magnetic south, and spent 48 hours at the Pole, noting down in his journal while there and on the journey more scientific data than any other polar explorer except Nansen. The only particulars which concern us at present are as follows: he found the drift of the ice to be in the direction of Greenland, and the condition of its surface "nearly the same as it had been continuously since leaving the 88th parallel. It was slightly more active." The ice, where he measured it, was 16 feet thick, and the tallest hummock was 28 feet in height above the water.

Admiral Peary's claim has been set forth in some detail already, but a few additional facts must be given, and some others repeated here for the sake of comparison. The distance of the Pole from Cape Columbia is given as 413 geographical miles, but Peary never used a sledge-meter. His dead reckoning was merely estimated, so that he had no check whatever upon his observations. We have seen how his judgment varied with his experience in the estimation of mileage, and there is no guarantee of his final infallibility. His second observations could not be taken at 6 p.m. on April 6th as the sky was overcast, but having moved on 10 miles he got them at midnight. At 6 a.m. on the 7th he took his third sights, and at noon his fourth and last. After giving these particulars he enlarges upon them considerably, in accordance with his custom, and then in a footnote he deals with the question as to how closely the Pole can be determined. This note is an example of Peary's best work. From his own point of view he handles the subject well. His style is sufficiently pontifical, but he successfully evades, while appearing to settle, the crux of the matter. He says that the master of a ship is assumed to be able to calculate his position to " within about a mile." Peary being a naval Captain he thus got the credit of being able to fix the Pole as accurately as this. He professes to be much more modest, however, and allows for possible errors up to five and even as much as ten miles. He is careful not to inform the general public, for whom he writes, that no ship can sail within 1,000 miles of the Poles, and that in the ordinary course of navigation they never get nearer to either of them than several thousands of miles. The result is that no mariner has to depend for his position on a noon observation with the sun only 7° above the horizon. But this was its altitude at the North Pole when Peary was there, with all the difficulties and uncertainties resulting from its being so low. We shall have to return to this later.

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[1] This is *minus* 37.7°. There were no plus temperatures.

[2] "My Attainment of the Pole," page 302.

He admits, perhaps unguardedly, that it is only by an extended series of observations that the Pole can be determined " within entirely satisfactory limits." Thus he can pose as a scientist before the unlearned ; but he did not do so at the Pole, where he only spent one day, without anyone to check his sights, and denied himself the extended series of observations which he knew to be vital if his results were to be placed above dispute. The examination of his records, on his return, will come up in its place.

The two Americans stand in a class by themselves, and each of them appears to be fairly comparable to the other. This is not the place to scrutinise Cook's credentials, but certainly his book is well able to hold its own against Peary's.

We now turn to the South Pole, where Captain Roald Amundsen arrived at 3 p.m. (meridian of Framheim) on December 14th, 1911, after a journey of 879 miles from his base as registered by sledge-meter. His dead-reckoning and observations had agreed to within about a mile on the way.[1] He had brought with him four other Norwegians, three of whom were navigators in addition to himself. They all checked the first set of observations at midnight after their arrival. Amundsen writes: "The result at which we finally arrived was of great interest, as it clearly shows how unreliable and valueless a single observation like this is in these regions." They found that they had gone out of the meridian they were following, midnight giving a greater altitude than noon. The latitude came out at 89° 56′ S. Wisting, Hassel and Bjaaland then set out on their ski to "encircle" the Pole with radii of 12½ miles. Amundsen and Hanssen in the meantime took 13 hourly observations (from 6 a.m. to 7 p.m. on the 15th) "to get our north and south line and latitude determined, so that we could find our position once more." The resulting latitude was about 89° 54′ 30″, and they were able to fix their meridian, so they moved on the remaining 5½ geographical miles, and set up their tent in time for noon observations on the 16th. Sights were then taken "every hour through the whole twenty-four," by the four navigators working in relays of two at a time, until noon of the 17th, when "Hanssen and Bjaaland went out four geographical miles (seven kilometers) in the direction of the newly-found meridian." During the night of the 17th to 18th they began their return journey after spending about 3½ days at the Pole. Altogether 42 observations had been taken, the sun's altitude being somewhat over 23°. On the return of the expedition to Norway these observations were submitted to the authority which had examined Dr. Nansen's observations, and his verdict, in short, was that the camp at the Pole lay between latitudes 89° 57′ and 89° 59′ S., and the longitude must be between 30° and 75° E., the probable position being roughly 60° E.

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[1] "The South Pole," Vol. 2. page 121 and following pages.

In Captain Scott's Polar party it is certain that there were three navigators, and possibly there was a fourth, Captain Oates being the doubtful member. Bowers, who was a Lieutenant of the Royal Indian Marine, generally took the sights,[1] and Dr. Wilson had, somewhat against his natural inclinations, learnt navigation for the occasion. The accuracy of their observations was proved on their arrival at the Pole by finding all the Norwegian records. On January 17th, 1912, after a journey of over 900 miles, they reached latitude 89° $53^{2}$ 37″, and then went 6½ miles due south, where Bowers took a second observation. On the 18th they found that they were one mile beyond the Pole and three miles to the right, and on moving in the new direction, at about a mile and a half from their location of the Pole, they came to the Norwegian tent. Scott writes: "Sights at lunch gave us half to three-eighths of a mile from the Pole. . . . There is no doubt that our predecessors have made thoroughly sure of their mark, and fully carried out their programme."[2] They started back the same day, and on their way Scott wrote, "It is satisfactory to recall that these facts give absolute proof of both expeditions having reached the Pole, and placed the question of priority beyond discussion."[3]

The radical difference between the two pairs of polar expeditions was well expressed by Captain Scott when he wrote that the Norwegians had "made thoroughly sure of their mark." The fundamental weakness of both the American explorers was that they did not go to the trouble to make their mark sure, with the result seen in the unedifying North Polar controversy. The North and South Polar areas are in some respects similar to, and in other respects very dissimilar from, each other. In both regions the sun makes a very small angle with the horizon, and it is on the horizon that the aberrations caused by the atmosphere are at their maximum. Refraction is not only a very great, but a most uncertain, if not incalculable, cause of error. The uncertainty of all solar observations in these regions was vividly shown on Sir Ernest Shackleton's 1914 expedition.

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[1] "Scott's Last Expedition," Vol. 1, pages 539, 543

[2] "Scott's Last Expedition." page 540.

[3] *Ibid.*, page 563.

On April 15th, 1915, one minute after the sun had set, it rose again "a semi-diameter clear above the western horizon." Again, seven days after it should have set for the winter, the sun appeared on May 8th, at 11 a.m., disappeared at 11-15, rose again at 11-40, set at 1 p.m., rose at 1-10, and set lingeringly at 1-20 p.m. Sir Ernest adds: "These curious phenomena were due to refraction, which amounted to 2° 37′ at 1-20 p.m. . . . We calculated that the refraction was 2° above normal; in other words, the sun was visible 120 miles further south than the refraction tables gave it any right to be."

Scott stands apart from the other three polar parties as he found the Pole located when he reached it. Two of the three which more particularly concern us, Amundsen and Cook, fully admit the uncertainty of such observations as are usually taken. Amundsen says, as already quoted, that a single observation, even with four navigators to check it, is "unreliable and valueless." Peary had four observations taken by one navigator. He stands absolutely alone in endeavouring to base his claim on such a futile foundation. This is a matter of great significance. Cook, quite properly, appeals to the sum-total of the records presented. We have seen how much reliance can be placed upon Peary's records.

Every isolated observer lays his sights open to dispute because there is no possible check on mistakes. This liability to error makes all observations that are not checked by at least one other observer, especially in these regions, of very little value. Captains Scott and Amundsen knew full well that observations at the Pole taken by a single observer would be rightly open to dispute; hence they were equally careful to have several skilled navigators at the crucial point, in order to amply verify the sights. Amundsen probably took one navigator more than Scott because the attainment of the Pole was the sole object of the Norwegian expedition, whereas it was only one, if an important, part of the British programme. Yet Scott instructed those of his staff, who were not navigators by profession, in the science of navigation. Thus the southern observations could never be questioned.

The establishment of all observations above dispute was of far greater importance at the North Pole than at the South because of the circumstances peculiar to the Arctic in addition

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1. "South," pages 45 to 49.

to the difficulties common to both the Poles. At the North Pole there is no land, so that all observations must be taken from a floating platform of ice, and no record can be left to be verified by others. Then it was vital to the whole purpose of both the American explorers that their most northerly positions should be fixed, if it were possible, beyond all reasonable doubt; yet neither of them took even so much as a second navigator, and neither stayed more than two days at the Pole. In acting thus they were simply asking for all the trouble which has arisen in consequence of their own neglect. The reason that Peary gave for not taking a companion,[1] that he would not allow anyone else to share with him the glory of the achievement, is not only most reprehensible, but also shows the type of man he was.

The errors of the individual observer are multiplied by the atmosphere, and can be eliminated only by a long series of sights. It is difficult for explorers to remain many days at the Poles, but if they wish their claims to be accepted they should not undertake these ventures unless they can do so fully equipped. The following table sets forth the four series of observations in the order of their reliability :—

POLAR OBSERVATIONS, IN ORDER OF RELIABILITY.

| Leader. | Sun's approx. alt. | Hours at Pole. | No. of observers. | No. of observations. | Date. |
|---|---|---|---|---|---|
| | | SOUTH POLE. | | | |
| Amundsen. | 23° | 72 | 4 | 42 | Dec. 14-18, 1911. |
| Scott. | 23° | 48 | 4 | 4 | Jan. 16-18, 1912. |
| | | NORTH POLE. | | | |
| Cook. | 12° | 48 | 1 | 7 | Ap. 21-22, 1908. |
| Peary. | 7° | 30 | 1 | 4 | Ap. 6-7, 1909. |

It will be seen that Peary is in the worst condition of them all. It was not his fault that the sun was so low, because he was obliged to get back to land before the pack broke up. Still, the fact remains, that the value of the northern observations is still further reduced as compared with the southern ones from the single circumstance of the relative altitudes of the sun. Scott and Amundsen timed their arrival at the South Pole to coincide with the summer solstice. Peary's sights, however regarded, are the most unsatisfactory that have been taken at either of the poles; he stayed the shortest time and he took the least number of observations, with the sun at its lowest declination. Apart from this comparison Peary's own false valuation of himself and his deeds might continue to be uncorrected indefinitely.

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[1] When lecturing in Manchester.

Amundsen, even with four skilled navigators, had not been able to keep to his meridian on approaching the South Pole, and it was necessary before all things to accurately fix it. Can anyone suppose that Peary and Cook were so divinely favoured that, in spite of their "unreliable and valueless" observations, they never swerved either to the right hand or to the left? They must have imagined that they were incapable either of error or of correcting it, for neither of them appears to have made any attempt to fix a north and south line. They went roughly by compass, but the needle is not very reliable in that locality. Again, even the excellent Norwegian observations could not fix the longitude within 45°. At the mathematical Pole this does not matter, but the range of meridional uncertainty increases with the distance from the Pole. The drift of the Arctic pack befogged an expert scientist like Dr. Nansen for several weeks. Peary seems to have entirely ignored his drift, and appears to have never attempted to determine his compass variation. As he could not have marched 98 miles in one day he could not have been within about 50 miles of the Pole; the uncertainty of his longitude, therefore, must be enormous. Exactly what position he attained will never be known, but he may have got anywhere along an arc struck from Cape Columbia with a radius of some miles short of 400. The maximum culmination of the sun is very difficult to judge at the Poles, and the displacement of the periods of culmination amounted to as much as one hour and a half in latitude 89° 59′ with Amundsen. Its apparent altitude at culmination at the North Pole was less than half that at the South Pole, owing to the difference in the dates, so that Peary's liability to error was much greater than Amundsen's or Scott's. Peary claims to have located the Pole to within five miles, if not to within one mile: Mr. Balch credits both Peary and Cook with attaining to within ten miles of it; but neither of them, on their return, could possibly prove that no mistakes had been made, or, indeed, that the altitudes on which they based their calculations had been, in fact, observed. This is a matter that hangs entirely upon their reliability.

These claims to have attained the Poles cannot be judged on less than the fullest consideration of all the data the explorers bring back. The verdict of science must be that, apart from the journal, the astronomical observations alone are of no particular value as proof of any position unless they are checked by several observers over a long series of sights. Thus it was that when Cook's observations were submitted to the scrutiny of the University of Copenhagen they gave the only possible verdict, that such figures were no scientific proof of his attainment of the Pole. But, in the wretched controversy of that time, *the equally certain verdict on Peary's observations was never sought; though, if his figures had been submitted to the same, or any other, independent authority no other verdict was possible.*

Neither Peary's nor Cook's observations could amount to positive proof that they had reached the Pole, if only because a single observer can write down any altitude that he pleases. The claims these two explorers have made require to be well substantiated by all their other records, and especially by their daily journals. We have carefully examined Admiral Peary's record of his journey, and we have found that it cannot support his claim to have reached the Pole. His claim has broken down because it is not substantiated by the detailed account that he has presented. His narrative, fortunately, stands alone among the published journals of the heroic band of polar explorers; it is unscientific and inaccurate, it contains exaggerations of the truth as well as incredible statements and inferences; the reliability of his word has been destroyed by the subsequent discoveries of other explorers, in spite of the fact that some of them admired while they corrected him. It now remains to be shown that his original records were never examined by an unimpeachable authority.

### Official Disproof of Peary's Claim.

The Sub-Committee of the National Geographic Society of America professed to have scrutinised Peary's journal, observations and instruments. They were extraordinarily quick about it, but on their assurance that all were in order he was acclaimed by the world as the conqueror of the Pole. Page 364 of his book informs us that the chairman of this geographical committee was Mr. Henry Gannett, Vice-President of the Society. Not long after the report was issued Mr. Gannett and Peary were called to give evidence before the sub-committee of the "Committee on Naval Affairs" of the United States Government, in connection with Peary's promotion to the rank of Rear-Admiral. Both of them were closely questioned by the chairman, Mr. Roberts, as to this examination of Peary's records, and one or two serious discrepancies were discovered. Mr. Roberts summed up by saying it seemed "quite conclusive that the examination of the Geographic Society's Committee was anything but careful." Nor is this all. Peary's own evidence brought out the manner in which this Geographical Committee had verified his records, and Gannett admitted that the only occasion on which the Committee ever saw the records was at *the Pennsylvania Railway Station at Washington.* The following is an actual extract, given *verbatim,* from the official Congressional Report, Private Calendar No. 733, Sixty-first Congress, Third Session, House of Representatives, Report No. 1961, pages 21, 22 :—

Mr. ROBERTS : First, how did the instruments come down?

Captain PEARY : They came in a trunk.

Mr. ROBERTS : Your trunk?

Captain PEARY : Yes.

Mr. ROBERTS : After you reached the station and found the trunk what did you and the committee do with regard to the instruments?

Captain PEARY : I should say that we opened the trunk there in the station.

Mr. ROBERTS : That is, in the baggage room of the station?

Captain PEARY : Yes.

Mr. ROBERTS : Were the instruments all taken out?

Captain PEARY : That I could not say. Members of the committee will probably remember that better than I.

Mr. ROBERTS : Well, you do not have any recollection of whether they took them out and examined them?

Captain PEARY : Some were taken out, I should say; whether all were taken out I could not say.

Mr. ROBERTS : Was any test of those instruments made by any member of the committee to ascertain whether or not the instruments were inaccurate?

Captain PEARY: That I could not say. I should imagine that it would not be possible to make tests there.

Mr. ROBERTS: Were those instruments ever in the possession of the committee other than the inspection at the station?

Captain PEARY: Not to my knowledge.

By the courtesy of the Librarian of Congress, which I should like to take this opportunity of gratefully acknowledging, the above has been officially verified at Washington. A copy of the complete Report may be seen at the British Museum. This would appear to deal the death-blow to Peary's Polar pretensions. He always insisted that the only absolute proof of attainment was by expert examination of the original records, but he took very good care that his own were never seen. They have never yet been examined. This is a matter of the utmost importance. Why have they been withheld from proper scrutiny? If there was nothing the matter with them why all this subterfuge and chicanery? This seems to be the strongest evidence that Peary's records, if properly examined, would not prove that he had reached the Pole, but rather that, taken in connection with the contents of his book, they would most probably prove that he had not been there. An honest man always welcomes the widest, as well as the strictest, scrutiny of his actions; he does not fabricate stratagems like the above in the hope that they will never be found out. As a naval tactician Peary probably believed that the best defence was by making a formidable attack, hence the violence of his assaults upon Dr. Cook.

Perhaps one point should be made a little more clear. In Peary's evidence the instruments alone are mentioned, but in that of Mr. Gannett, and he was chairman of the Geographic Committee, the discrepancies discovered were with respect to the original journal, so that all Peary's records are involved. On page 15 of the above Report the Chairman says: "It will be seen that Mr. Gannett, after his careful examination of Captain Peary's proofs and records, did not know how many days it took Captain Peary from the time he left Bartlett to reach the Pole and return to the 'Roosevelt,' that information being supplied by a Mr. Grosvenor." There was also a serious discrepancy in the equipment for the final dash, Gannett giving Peary four men, two sledges and either 32 or 36 dogs, while Peary stoutly maintained that he had six men, five sledges and 40 dogs. As the Chairman said, these were vital points.

Peary had successfully established the tradition that he was the only man who could ever reach the Pole. Hence, when he said that he had been there, "his" committee, for such the report informs us that it was, obediently registered his decree. The societies of other nations never questioned the reports of kindred bodies, and had themselves begun to imbibe the American Peary tradition. This is one explanation of the astounding mistake made in 1909. But the climax of this affair is not reached until a recent number of the National Geographic Magazine is seen. This magazine is the official organ of the learned society which scrutinised Peary's records at the railway station. In the issue for January, 1923, among other issues, this Society's advertisement appears inside the cover with the following words: "*The Society also had the honour of subscribing a substantial sum to the historic expedition of Admiral Peary, who discovered the North Pole.*"

Here we have the interpretation of the whole matter. The people who paid for Peary's expedition were also the sole judges of his success. Their verdict, therefore, was a foregone conclusion. It is a pitiful business, although the grotesque aspect of it will no doubt appeal to many.

## V.—A Suggested Explanation.

If it could ever be excusable for a traveller to exaggerate his mileage Peary had an excuse on his last journey. *Dr. Cook was in the field.* Let us try to understand Peary's position. For twelve out of the previous 23 years he had been exploring the Arctic regions, and since 1898 he had been deliberately laying siege to the Pole. Its attainment had become the one object and ambition of his life. Before he left home in 1908 he had learnt that Dr. Cook was in the north and might make a bold bid for the trophy which Peary had come to regard as exclusively his own. As soon as it became possible for him to make one more attempt he would forget that, after his failure in 1906 he had published his relinquishment of the project, and he would feel that Cook was poaching on his preserves. It was, in part, a parallel case to that of the South Pole, to which Peary and Cook were the cause of Amundsen's expedition being diverted, from the north. Peary, like Scott and Shackleton, had pioneered a route to the Pole, but Peary does not appear to have found the best, although it was the shortest, direction. After 1906 explorers of any nation had a perfect right to continue the quest by Peary's, or any other route. Should Peary change his mind there might be complications, but in any case Cook, like Amundsen, was quite entitled to discover a better route if he could. Unlike Amundsen, however, Cook was violently attacked by his predecessor for having done so.

On arriving at Etah in August, 1908, Peary learnt that Cook had started for the Pole in the spring and had not yet returned. Peary knew, therefore, that he might be forestalled. This must be borne in mind. He had many advantages over Cook, and immediately formed the resolution not to return without victory. The temptation to secure the coveted trophy at all costs was about as strong as any temptation could be, especially to a man of Peary's haughty temperament. He was not likely to be over-scrupulous as to the means employed to achieve success; but he may as well not reach the goal unless he can make quite sure of getting safely back again.

As far as Bartlett's last camp he could only go wrong by wandering from his meridian, but he appears to have given us a narrative of the region beyond latitude 87° 47′ N. which is only founded on fact. On leaving Bartlett for his final spurt he would naturally feel the exhilaration he describes, somewhat as a schoolboy exults at the freedom of the holidays. He knew that, at last, no one could rob him of the desire of his heart, for he had shaken off all possible critics. There was no one to see what he might, or might not, do, or to challenge whatever claim he might afterwards make. His equipment should have enabled him to cover the distance to the Pole and back. By the third day this exhilaration, which seems somewhat frothy, had evaporated. The effects of their 400-mile struggle over the hardest track in the world began to be felt. It had been done under frightfully severe temperatures, as low as minus 50° F. Peary could not have known where they were, for he had never fixed his meridian and had no means of keeping a course due north. Fiction is so interwoven with what they actually did that Peary confused himself over it, or he would never have committed that blunder about the 98 miles in one day. The truth, in all probability, will never be known, but there is nothing in his account of the Pole that he could not have written 50 miles away from it. The well-worn formulæ are repeated, rather senselessly it seems, that "the going is better and better," and that they had time for only "a few hours sleep," with the customary dissertations on side-issues.

He may have got alarmed at the deterioration in the condition of the dogs. They had suffered from a serious epidemic in the winter. He had to start killing even his 40 picked animals on the third day of his spurt, and he mentions their signs of exhaustion at this time. Several things of which we are not told may have occurred, such as trouble with the Eskimos. They may have insisted on turning back, for we are told on page 246 that "these odd people are rather difficult to manage." Chapter 24 is entitled, "Some of my Eskimos lose their nerve," and he tells of their demoralisation at the Big Lead. Soon after leaving Bartlett he would realise that, in order to make quite certain of getting back to home and fame he had better turn soon. The last 50 miles was not worth risking, especially since it was so improbable that his direction was due north. It could not matter where he went, provided he got back and had his story ready. He mentions his fears that they might never return, which would leave the hateful Cook sole victor on the field of glory. His return in 1906, from much farther south, was a perpetual nightmare to him; and on the 1909 journey there was one district that he greatly feared, for the ice might break up and cut him off from land. He might easily lose all in gaining a few more miles, and even then he would not have hit the correct spot.

He would probably reason how slight was the importance of locating the mathematical pin-point, and this was perfectly true. Any change in the conditions was unlikely north of the 89th parallel. If there was nothing to discover why go on? When he wrote his account he had Cook's description before him, and learnt that on the other route the conditions were not supposed to have altered after the 88th parallel was passed. Then there was no one to check whatever observations he might take, so that it would be impossible to prove that he had *not* reached 90° N. With the sun so very low observations were in any case most uncertain, but they would serve to impress pseudo-scientists and to impose upon "the gallery," if he could escape the examination of his records by neutral experts. This important particular he had taken care to control. He could trust "his" committee. In short, as no one could ever find out what he had done, he may just as well return.

Peary's story, like Cæsar's wife, was not above suspicion; but, had it been as pure as Scott's journal one cannot help thinking that if an imposter had planned the final effort he could have done so in no other way than that in which Peary planned it. He was probably able to travel *as far as* the 89th parallel, but he could not be sure of his course. Many scientists will admit that there was little to be gained by pushing on any further, especially as it was most improbable that it would bring him to the right place. This was near enough for all practical purposes, it was as near as he was likely to be able to get, and he could tell his staff, on his return to the ship, that he had been successful, for he had undoubtedly reached the Polar Area. He naturally says nothing about this, for the death of Marvin was the sole topic when Bartlett met him, and the tragedy may have saved Peary from very awkward questions. On arriving at Etah, in August, he learnt that Captain Cook had passed through on his return, and had claimed to have attained the Pole the year before. From that time Peary concentrated all his considerable resources upon the agreeable task of smashing his rival, and so he gained his Pyrrhic victory. Cook had a far greater effect on Peary's story than appears to have been recognised in England. Had it not been for the presence of a competitor we should probably have received a much truer statement of events.

Peary's books have a peculiar, and to the English reader a displeasing, style; they seem to us so sadly deficient in good taste. If his last work had not been the sole official record of the expedition we could never have taken it seriously. It is difficult to conceive the mentality of a man who could insist on the greatest achievement of his life being judged by such a poor production; but he issued nothing else, so he must needs stand or fall by what he has given us. Instead of being a scientific journal of discovery its proper classification is that of newspaper articles and popular journals. Its appeal is to the general public and not to students of geographical exploration, or to any who value exact information. It may be said of Peary as Macaulay said of Southey, that "it has never occurred to him that there is a difference between assertion and demonstration." Peary was not a scientist, and so he could not write for scientists. His style is vivid, his colours are crude and his writings abound in mistakes. He belonged to that militant species of humanity which is always forcing itself to the front, but whose methods of attaining what they think success are dissolved by the calm observation of history. The newspaper scare that Peary inflamed on his return soon passed into the oblivion it deserved. It never made any contribution of value towards the establishment of the truth. Posterity will not be deluded by the meretricious arts that Peary indulged in.

These blemishes cannot obliterate, though they mar and distort, any valuable work that Peary may have accomplished. He was, perhaps, the greatest of all Arctic travellers, and may have done more sledging in high latitudes than any other man on record. He was not a very successful explorer, and he was a most inaccurate cartographer. He loved the wild life of the north, but he was unreliable and prone to exaggeration. With all his faults it is a great pity that he should have ended his Arctic career by virtually falsifying his log-book; but he may have thought that in so doing he was merely following the example of the eminent explorer to whom Americans owe the discovery of their continent. Peary was a martyr to the cause of Arctic travel, for his fine constitution became undermined by the continual exposure. He was strong enough to keep on until he was too old for such work, and he died of pernicious anæmia.

NOTE. While the foregoing was being written Sir Clements Markham's work, "The Lands of Silence" (Cambridge University Press, 1921) was in the press, and when I had finished it came into my hands. It continues the labours of Dr. Nansen, as given in his work, "In Northern Mists," as well as those of Dr. Mill in his "Siege of the South Pole," down to the years 1912, or thereabouts. It is an authoritative production of the 'old school' of British polar explorers, and will carry considerable weight for some time. Sir Clements dethrones Peary from the exalted position he assumed in his writings, and reduces his work to its proper scale in proportion to that of other explorers. This distinguished author, also, supports the views expressed in this paper. He writes with considerable restraint, but he does not credit the claim of either of the Americans to have attained the North Pole. He appears to be rather more sarcastic about Peary than about Cook, and he accepts Cook's discovery of Bradley Land, but he repudiates alike their observations for position. He points out that there is no reference to "the latitude and longitude of Cape Columbia having been fixed, and no mention of any observations for amplitude during the whole journey. Without such observations it would not be possible to keep on the same meridian. Yet, after journeys during four days estimated at from 25 to 30 miles a day, a meridian altitude of the sun was taken which gave a latitude of 89° 25′ N. or 97 miles due north from the position where Bartlett observed. Without amplitude observations this would not be possible, so that there must be mistakes in the observations for this and subsequent meridian altitudes. The sun was very near the horizon at noon at that time of the year" (page 357).

Although Sir Clements Markham is in complete agreement with the main conclusion of this paper, he might not have gone so far as I have done in crediting Peary with attaining to within 50 miles of the Pole. He is a little impatient of these "dashes to the Pole," and somewhat curt in dealing with them; but I cannot see how else the Arctic Basin could have been reconnoitred. It may now be done by aeroplane, but not so efficiently. The drift of a vessel is a much more thorough means of final exploration. Sir Clements gives due prominence to the need for exploring the greater part of the polar ocean, and is a believer in land near the Pole. He repeatedly refers to Peary's "great energy and indomitable resolution," but he does not admit most of his claims. With regard to the 1906 journey Sir Clements intimates that the return to Greenland was due to Peary's miscalculation of his position rather than to the eastward drift of the pack. He unreservedly condemns him for not taking another white man with him beyond 87° 47′N. in 1909. Peary is finally dismissed, in characteristic fashion, with these words: "His incomplete observations, as already stated, caused the recording of a non-existent channel from the east to the west coast of Greenland, and the publication of quite erroneous maps for many years" (page 380).

Mr. R. E. Priestley, of the Scott and Shackleton expeditions has told me that, "As regards the Peary-Cook contro-

Plate IV.

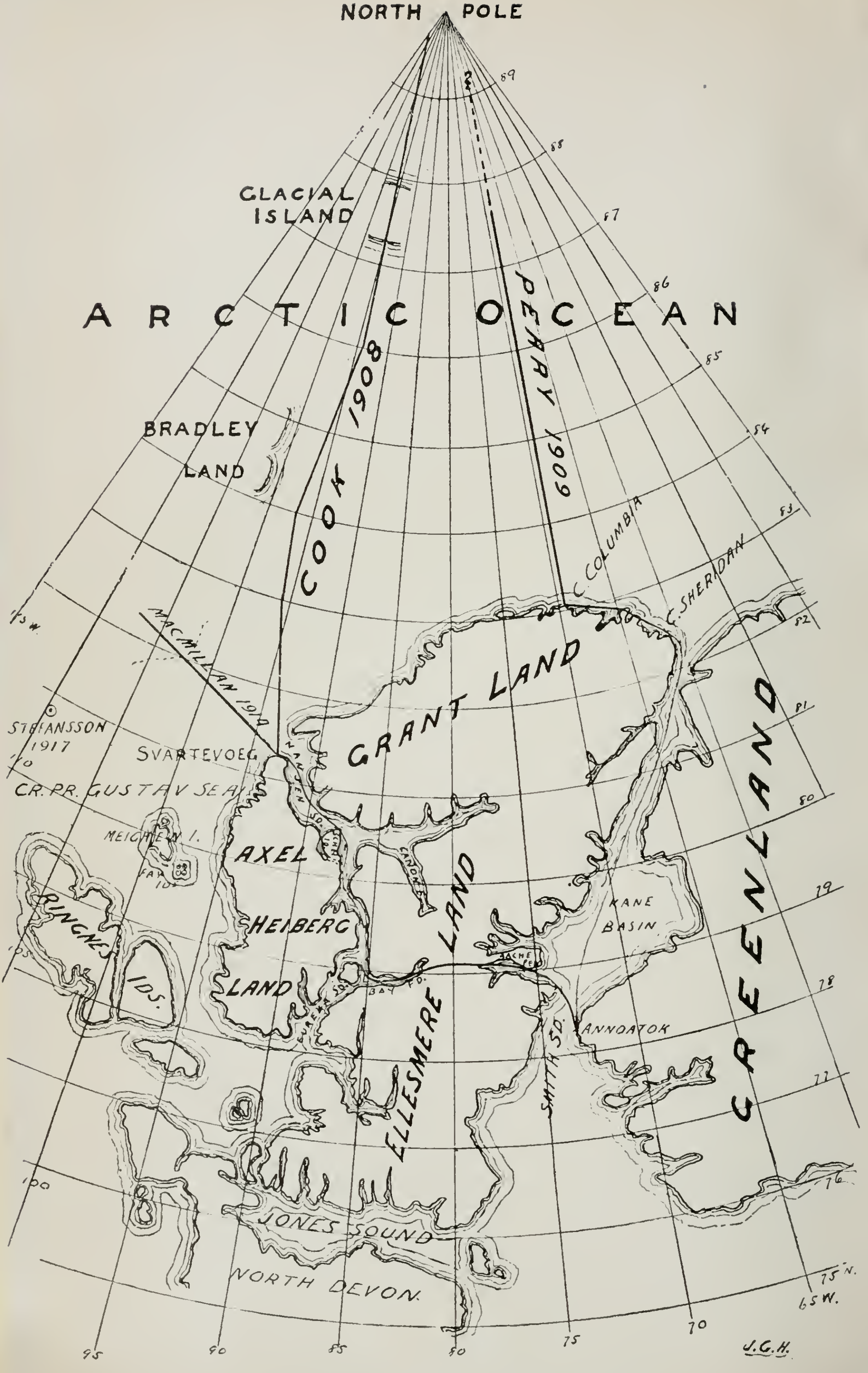
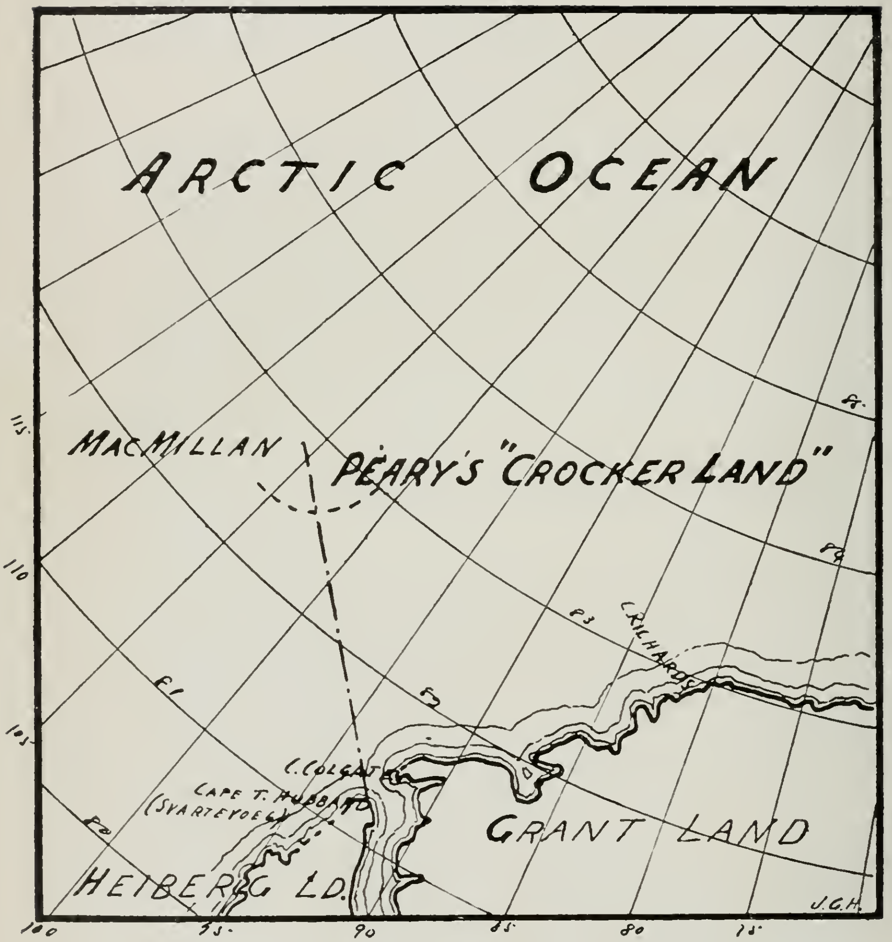

NORTH POLE
89
88
87
86
85
84
83
82
81
80
79
78
77
76
75 N.
65 W.
70
75
80
85
90
95
100
105
110
115 W.
GLACIAL ISLAND
ARCTIC OCEAN
PEARY 1909
COOK 1908
BRADLEY LAND
C. COLUMBIA
C. SHERIDAN
MACMILLAN 1914
STEFANSSON 1917
SVARTEVOEG
CR. PR. GUSTAV SEA
MEIGHEN I.
FAY IDS.
RINGNES IDS.
AXEL HEIBERG LAND
NANSEN SD.
GRANT LAND
CANON
ELLESMERE LAND
KANE BASIN
BACHE PE.
BAY FD.
EUREKA SD.
SMITH SD.
ANNOATOK
GREENLAND
JONES SOUND
NORTH DEVON
J.G.H.

Plate III.


ARCTIC OCEAN
MACMILLAN
PEARY'S "CROCKER LAND"
85.
84
83
C. RICHARDS
82
81
C. COLGATE
CAPE T. HUBBARD
(SVARTEVOEG)
80
GRANT LAND
HEIBERG LD.
J.G.H.
115.
110
105
100
95.
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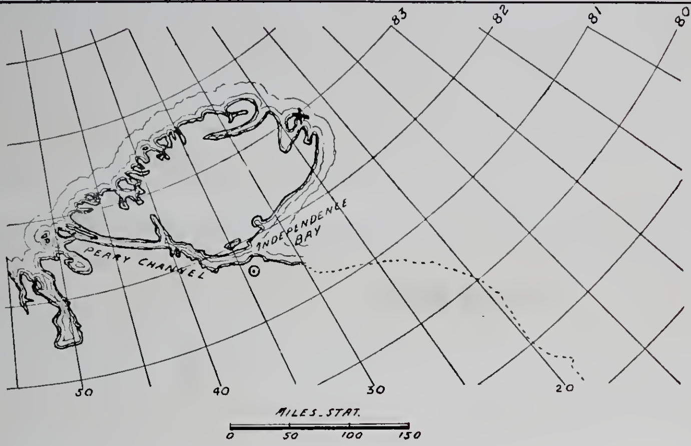
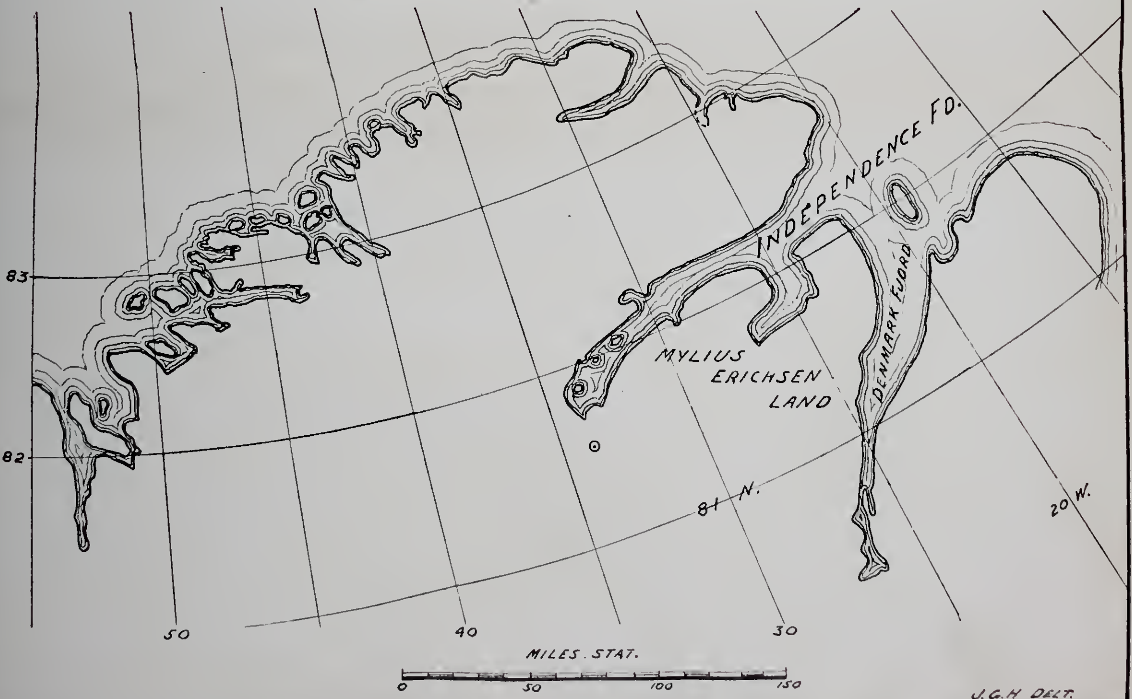
80
75.

Plate II.

## PEARY'S MAP OF NORTH-EAST GREENLAND.



## RASMUSSEN'S MAP OF NORTH-EAST GREENLAND.



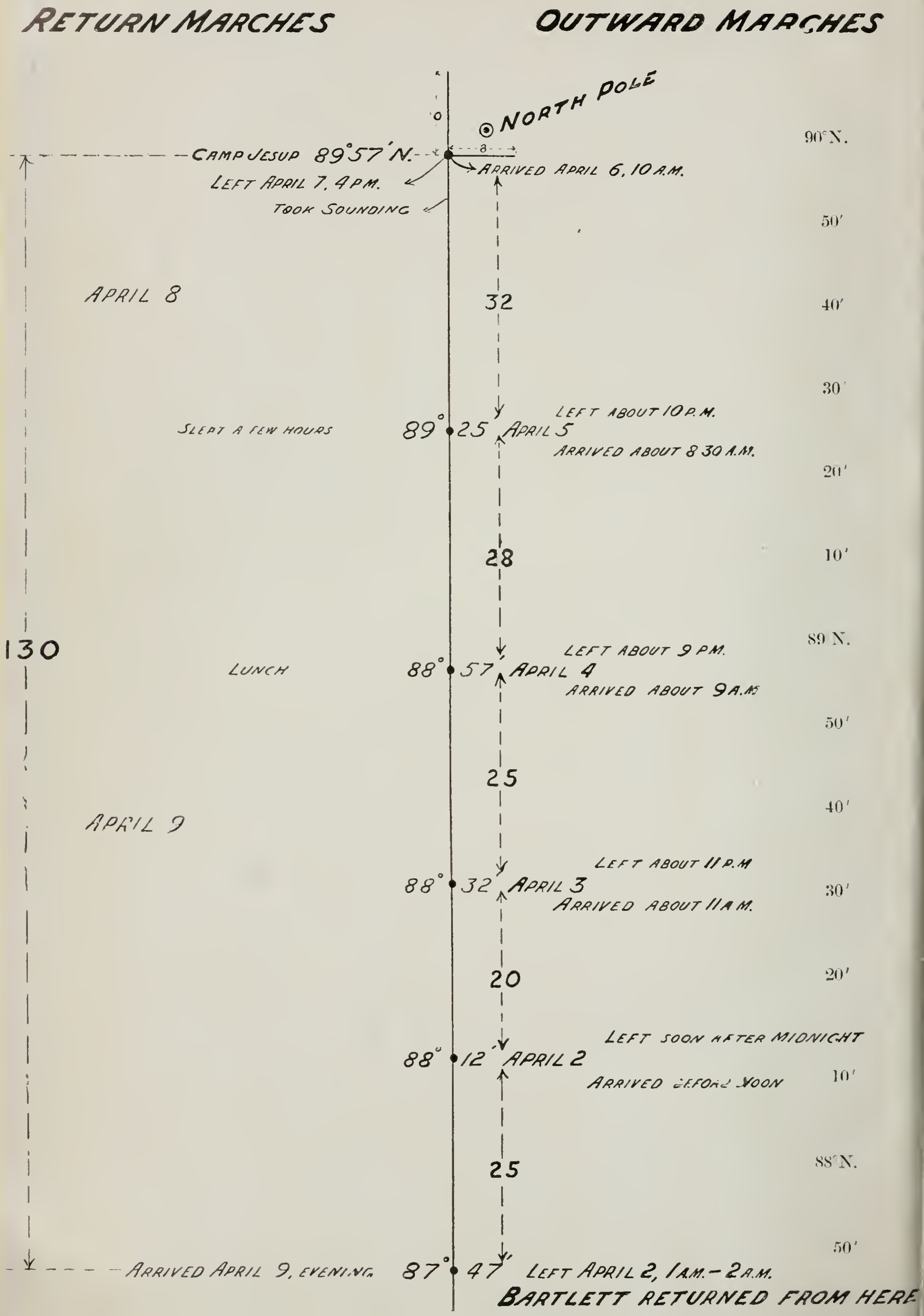
J.G.H DELT.

Plate I.

# PEARY'S RETURN FROM THE POLE
## To Bartlett's Last Camp.
With his "Final Spurt" over the same Distance.

Plotted to Natural Scale.

Note.—All miles are geographical.



versy . . . . our present position is that we feel doubtful whether either Peary or Cook reached the Pole." Lastly, Mr. J. M. Wordie has written to me as follows: "The main arguments which have been used against Dr. Cook might just as well be used against Admiral Peary, namely, that his rate of travel was surprisingly high, and that latitude observations alone, unsupported by observations to determine longitude or magnetic variation, are by no means convincing."

Grateful acknowledgments are tendered to the above explorers, also to Mr. R. W. James of Sir Ernest Shackleton's "Endurance" expedition, for his kindness in criticising this paper, and to Mr. James Smith for his help and advice, which have been of the greatest value.

# THE GOLD COAST COLONY AND PROTECTORATE.

By W. H. Barker, B.Sc.

(Delivered to the Society on November 21st, 1922.)

The four groups of Crown Colonies and Protectorates of Gambia, Sierra Leone, Gold Coast and Nigeria appear on the map of North-west Africa as little more than enclaves in the

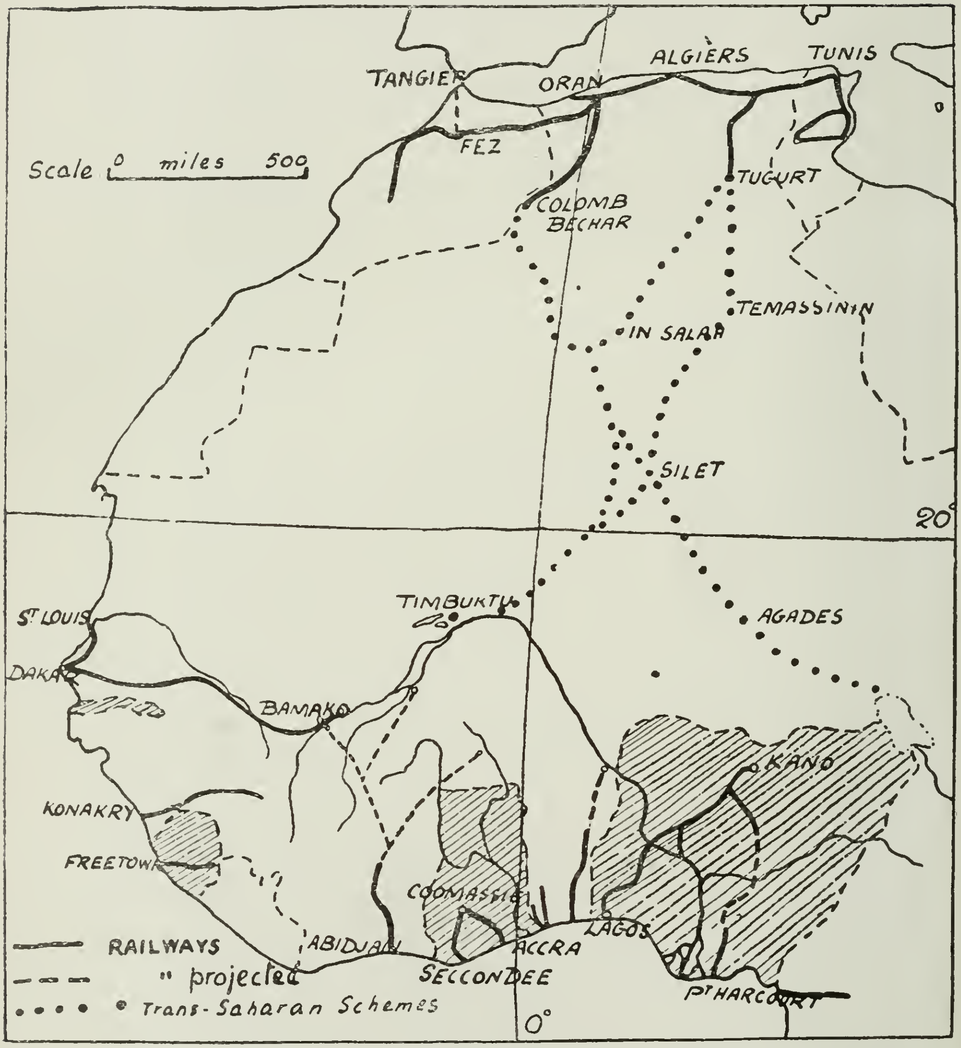


Fig. 1. West African Colonies and Trans-Saharan Routes.

vast French empire of North Africa. At present, when all these areas are but at the beginning of an era of greatness, such relationship may seem negligible, though the future may reveal a new significance therein when the Western Sudan becomes developed and linked by trans-Saharan routes with the rapidly expanding regions of Northern Africa. All these British colonies have grown in comparatively recent times from the mere castle footholds and coastal strips that long formed the bases of the slave traffic. This fact, together with the old ideas which still persist of negro inefficiency, ignorance and general incapacity, has belittled in the public mind the importance of these lands, as the map of Africa dwarfs their size. A full and accurate study necessitates the finding of a scale by which to estimate not only the actual areas, but the degree of African efficiency and the general and economic importance of the regions. The following table summarises a few of these particulars :—

| Colony. | Area in sq. miles. | Population. |
|---|---|---|
| Gambia ... ... ... | 4,134 | 209,000 |
| Sierra Leone ... ... | 31,000 | 1,541,311 |
| Gold Coast ... ... | 80,000 | 2,078,043 |
| Nigeria ... ... ... | 336,700 | 18,500,000 |

| Colony. | Imports (including specie). | | Exports. | |
|---|---|---|---|---|
| | 1920.[1] | 1921.[2] | 1920.[1] | 1921.[2] |
| Gambia ... ... | £2,711,880 | £924,448 | £2,466,145 | £793,435 |
| Sierra Leone ... | £3,548,478 | £1,769,628 | £2,949,380 | £1,625,128 |
| Gold Coast ... | £15,152,145 | £7,661,324 | £12,352,207 | £6,942,197 |
| Nigeria ... ... | £25,216,507 | £10,768,812 | £16,987,018 | £8,028,412 |

1. A "boom" year. 2. A "slump" year.

Such an analysis, however, does not give even an approximate estimate of the colonies. The total figures measure only the goods and commodities passing through the Customs Houses and the population as determined by the last census. In countries such as our own a comparison of present figures with corresponding figures for the previous decades, furnishes a more or less reliable index of "tendencies," because it may be assumed that progress will remain "normal." For the African colonies no such deductions are possible. In the first place, the advances of medical science and its application to both European and African conditions of life not only reduces the abnormal infant mortality, but appreciably reduces the death-rate generally.* Though the census of 1911 may be too inaccurate to be used in comparison with the more reliable census of 1921, yet, in spite of the opinion of some that population is decreasing, healthier conditions and the increased knowledge of tropical medicines reduce the death-rate, in effect, producing an abnormal increase of the population. Import and export values as measured at customs stations fail to give an estimate of even the actual, much less the potential of production of a country where improved methods of cultivation may be, and to some extent are being adopted, where the standard of comfort is rapidly rising and where modern towns, as Coomassie, Accra and Seccondee, developing at an abnormal rate, draw their food supplies from the adjacent country districts. Even where barter and old-time trade routes maintain a link with the past, they only persist by adapting themselves to the changed conditions with increased and more varied trade commodities and with exchanges at more frequent intervals.

Time was when the terms "Guinea" or "West Africa" sufficiently recalled all that the white man knew of each or all the colonies. All were regarded as equally unhealthy on account of tropical rains which clothed the country with an impenetrable equatorial forest inhabited by semi-barbarous half-naked negroes who lived a life of unspeakable laziness and who in former times had constituted the vast reservoir of labour which supplied, under compulsion, the plantations of the West Indies and the Southern States. Needless to say, such ideas are far from the truth, and represent those crude imaginings begotten of ignorance which precede the days of better knowledge.

It is not possible, in these days, to link the four West African colonies together for the purpose of study. In important respects they differ fundamentally, and require independent geographical investigations. Even within the colonies themselves marked variation of physical and biological conditions call for careful and detailed investigation. For this reason, this article treats only with the geography of the Gold Coast Colony and the protectorates

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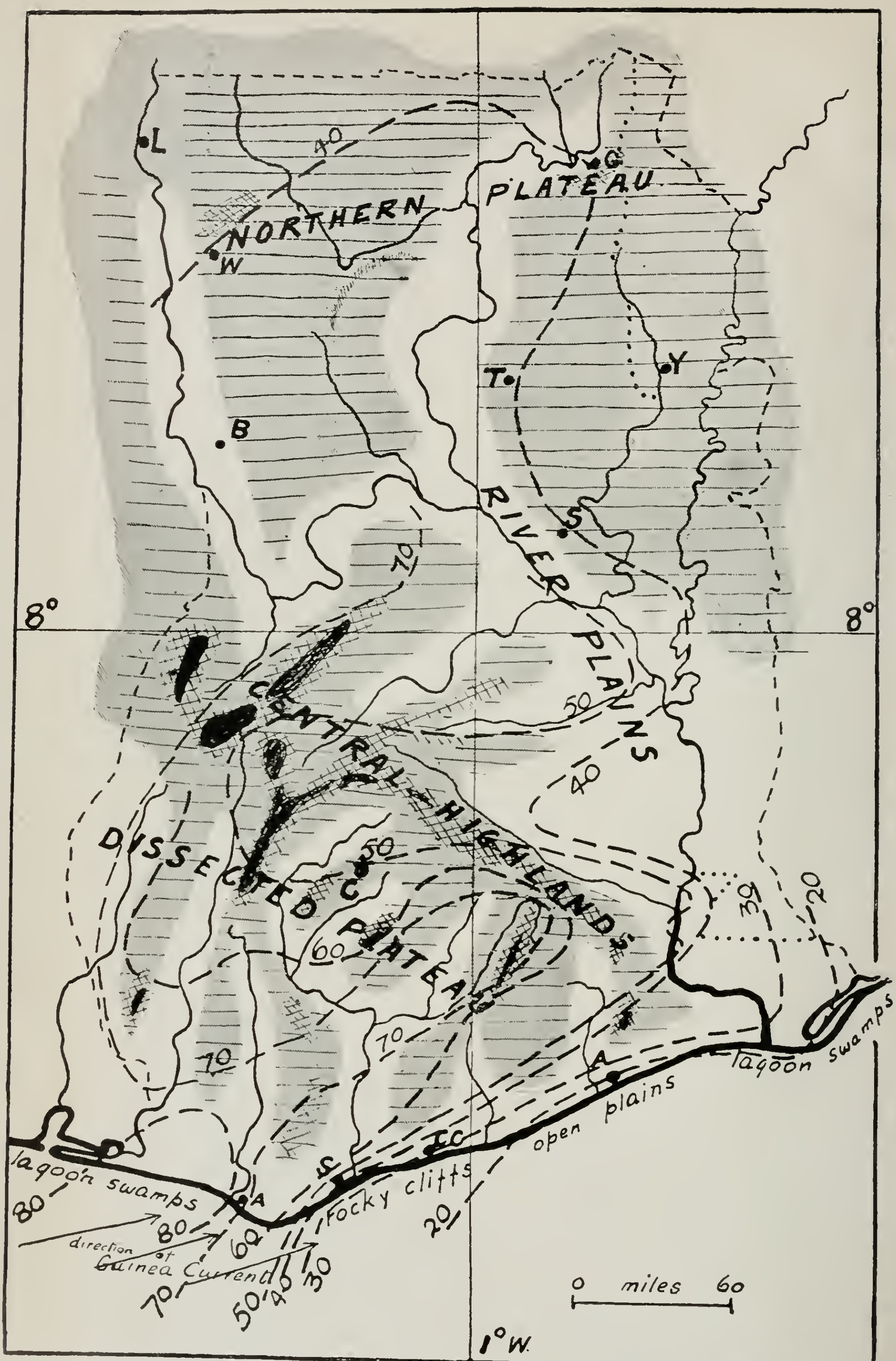
| | 1920. |
|---|---|
| * Percentage of total deaths at all ages ... ... | 22% |
| Deaths under one year per 1,000 births ... ... | 405 |



Map. 2. Relief (generalised) with Annual Isohyets (in inches).

of Ashanti and Northern Territories rather than with West Africa in general.

It would make for clarity if, in the first instance, the developments arising from European penetration are for the moment set aside, and the area viewed as the "home" of a people who had more or less adapted themselves to their physical environment without being subject to any great influence or stimulus which tended to change or progress. The relief (Map 2) shows a "divide" from Akwapim and the Shai Hills to Kintampo and the Banda Hills separating the south and south-westerly drainage from the northern peneplain of the Volta system. The present river system is an adaptation of bygone drainages, an adaptation which has been related to river capture, especially in relation to the Volta R.[2] Earth movements, too, have left their impress on other present day conditions, especially in the rapids, falls and lagoons at the lower reaches of the rivers. These have been described as due wholly or in part to the geologically recent uplift which has produced along many parts of the coast the 8 in—10 in. raised beach, the youngest of three or four raised beaches.[3]

This relief acts in a remarkable manner on the weather and climate, and especially on the rainfall of the region (see Map 2). The main ridge strikes across the path of the rain-bearing winds which pass up the numerous valleys whose line of direction is approximately that of the wind. Accordingly, precipitation is generally higher in the south-west, varying considerably, however, with the locality. North and east, not only is the seasonal precipitation less in quantity and shorter in duration, but from December to February the northern regions are exposed to the drying Harmattan winds from the Sahara, from which the south and south-west almost entirely escape.

The present natural vegetation associated with these conditions of soil, relief and climate, are indicated on map. There is ample evidence that the forest was formerly more extensive than at present and that a forest environment definitely influenced the manners and customs of the people, though they may now live outside the strict limits of the forest zone. The inhabitants of the Colony and Ashanti live almost entirely from the easy production by very primitive equatorial tillage of yams, maize, cassava and, in some areas, rice. In the coastal and lagoon villages it is perhaps true to say they live by fishing and the preparation of salt, exchanging these commodities for the foods and other products of the forest zone. Towards the north, and the Northern

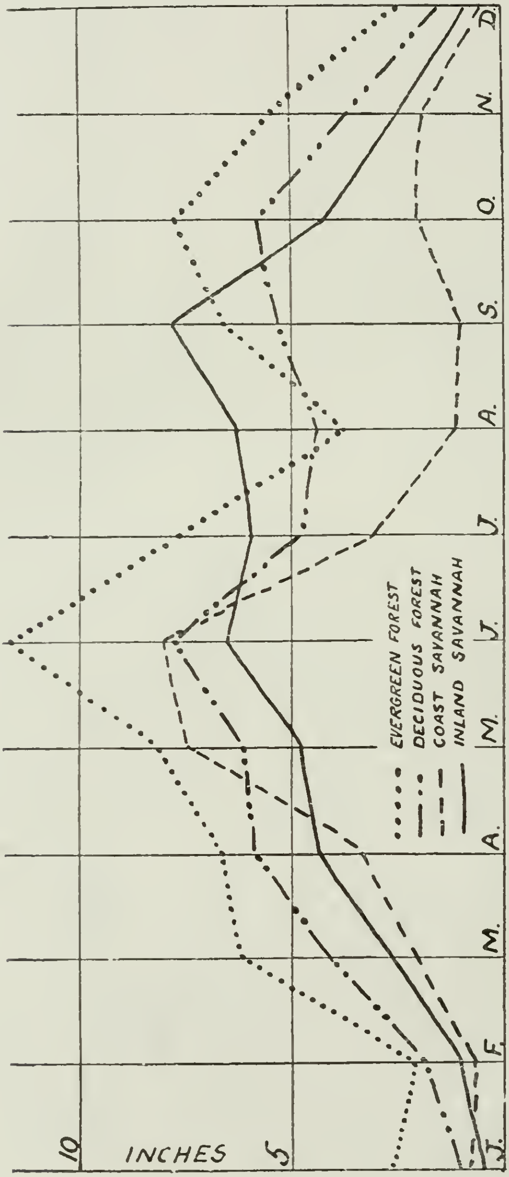


Fig. 3. Rainfall Graphs.

Territories, the savannah or park-like country which succeeds the forest, has attracted and encouraged peoples who combine with agriculture a certain amount of stock-raising.

In one principal particular a change has taken place in these otherwise stable conditions; that is, the undoubted gradual retreat of the forest before the savannah, until at the present time it stands at the limits shown on the map. With this retreat there has been a steady march southward of the people in bygone and present times. The Fantis of the "Colony" and the Ashantis both have a tradition that they come from the north, while many incidents occur to-day of southward migration, which in old time would have been associated with tribal warfare.[4] As far as observations go, there is a predisposition to think that rainfall is diminishing everywhere, affecting principally, of course, the regions where already the rainfall is but moderate.[5]

Many competent observers associate these phenomena with the larger question of the progressive desiccation of the Sahara; some have related it to the deforestation of the area by the Africans since their settlement by fires or by the replacement of the forest by plantations under European stimulus.[6] But though the forest is fast changing its character or disappearing altogether, custom dies hard, and the old forest environment still influences profoundly the manners and customs of the people.

Of all the laws and customs of these peoples, that which was, and still is fundamental and upon which the whole social life depends is the system of land tenure.[7] In the Northern Territories the principle has for a considerable time been virtually that of private ownership, but to the south, in the forest zone, the Ashantis and Fantis regard land tenure in a different manner.

In the light rain forests that border the Gulf of Guinea and extend inland and northward from 100 to 200 miles, the pure negroes made their homes. Until modern times, though they had been the objective of Moorish and other Muhammadan slavers from the Sahara and Sudan, and of European slavers on the Atlantic traffic, they remained more or less unmolested, and custom had so hardened into law that change was almost unthinkable. Lack of written language limited transmission of knowledge to speech and memory. Tillage and crops followed age long practice, the wisdom of the race was embedded in story or proverb, and even the complex national legal code was handed down from father to son in a group of people known as "linguists."

From the moment the tribal community settled down finally upon a definite piece of land, the land began to be the basis of society in place of kinship. Land acquired by the founder of any village is known as the family stool land, and land cleared by others who may come and settle among them belongs to the new-comers, not to the original families. Land acquired by both as a community is proportioned out, but is regarded as common land, and becomes attached to the stool of the person for the time being head of the village. As the village grows by the incoming of new families, the founder or the present head of his family becomes the Odzikuro (owner of the village) assisted by the heads of the new families. Thus arises the village council, and the different family groups become the village community. Villages may, by a variety of causes, become grouped under an Omanhene, whilst at least in the case of the Ashanti people, the ruler of Coomassie exercised such authority as the head of the Ashanti military organisation that the names of Coomassie and Prempeh may still conjure up visions of wholesale massacres and barbaric slaughters instead of the peaceful art of cocoa cultivation, to which during the last decade or so the Ashantis have assiduously applied themselves.

The stool and its close associations with the ownership and cultivation of the land stands almost as sole emblem of the authority, and one might almost say of the "soul" of the people. In family; among village and village groups and the people as a whole, the stool stands for continuity and the stool holder for supremacy and authority in the sphere of the stool. When an old stool is so decayed that it must be destroyed, it is burned and the ashes are made into a paste with oil, blood, eggs, etc., and smeared on the new stool, thus transferring from the one to the other all its associations, both spiritual and material. When the head of a family or a ruler is not engaged in the affairs of his office, the stool is kept in a special place on its side or upside down; while a meeting of stoolholders is described as, "The stools have assembled." The election of a chief shows the same reverence for, and association with the stool. To select a successor to a chief, the councillors of the stool and the subordinate rulers, with linguists, councillors, elders and people generally, assemble. No male person of the heritable blood in the direct line of succession eligible for the stool is allowed to be present. The elders and people, through their linguists, request the councillors and relatives to present a successor. This is done by a somewhat complicated process. After eight days the chief-elect is placed on the principal stool. He is then carried to his room, sacrifice is offered, and copious libations are made. The next morning the subordinate rulers enquire after his health, and on the same or next day he meets his people and gives them gold and drink. The people then retire to decide what reply they shall make to him for his gifts and whether they consider the gifts sufficient or not. If satisfactory, they request him to take the oath of office, that he will respect their ancient rights and liberty, observe the laws and customs of his country, and administer justice truly and faithfully.

These comments from Sarbah on the stool and the stool holders indicate how among these people age-long tradition, with all the bonds of sanctity and ceremony, determine their manners. By the social organisation of the people everyone comes under the influence of the stool in its relation to the living present, and through the accompanying sacrifices to their ancestors, to the living past.

How long such conservatism would persist and such balance between the physical and social conditions be maintained it is, of course, quite impossible to state. It would appear inevitable that had not a European influence of a very strong and marked character been brought to bear upon the region from the sea, there would have been an increasing pressure exerted from the north. Muhammadanism gradually extended southwards from the savannah and began to penetrate the forest, while towards the close of the nineteenth century the consolidation of the Fula empire upon the savannah lands threatened the conquest of the forest peoples.

This is not the place to discuss the political and economic situation in Europe towards the close of the nineteenth century which compelled a forward colonial policy in tropical Africa. It is sufficient for the purpose that territorial annexation was largely the outcome of the new industrialism and a pressing demand for new markets, both for the disposal of manufactured goods and the acquisition and production of food and raw material. If the value of the Gold Coast is regarded solely from the point of view of its present actual and potential production irrespective of changed conditions on the life of the inhabitants and the consequent reaction on production, we may class production into two main categories—mineral and vegetable.

It has long been known that gold dust was obtainable from the sands of the southern, and particularly the south-western rivers, and one of the early European developments was gold mining in the regions of Tarquah, Prestea and Coomassie, an exploitation which resulted in the construction of the Seccondee-Coomassie railway opened in 1903.

The needs of the Great War led to a more careful geological investigation, with the result that manganese, bauxite and diamonds (export 1922, 5.306 carats, £6,798) have been discovered, though the two latter have not assumed commercial importance. The general geological formations give hope that here, as elsewhere in the West African Colonies, mineral wealth of considerable importance may be expected.*

Developments such as these, however, do not affect directly to any great extent, the general life of the people. Labour is generally recruited for the mines from the Northern Territories, and, on the whole, it may be said that with material progress and education there will be an increasing difficulty in providing the requisite labour for this form of activity.

Of the vegetable production, the natural products of timber and the oil palm fall into one category and plantation production in another. Chipp has calculated [8] that out of an area of 80,000 square miles, only 28,000 may be said to be under forest of any kind, and 52,000 in open Sudanese vegetation. The population in 1921 was 2,078,043, of whom 894,000 are living within the forest area. Allowing 1 ac. per person for food, the area so taken up is approximately 1,406 square miles. Assuming that an area is kept in cultivation

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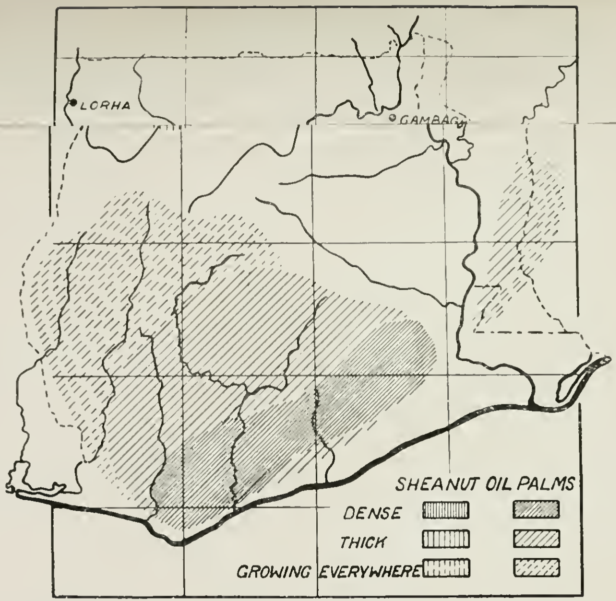
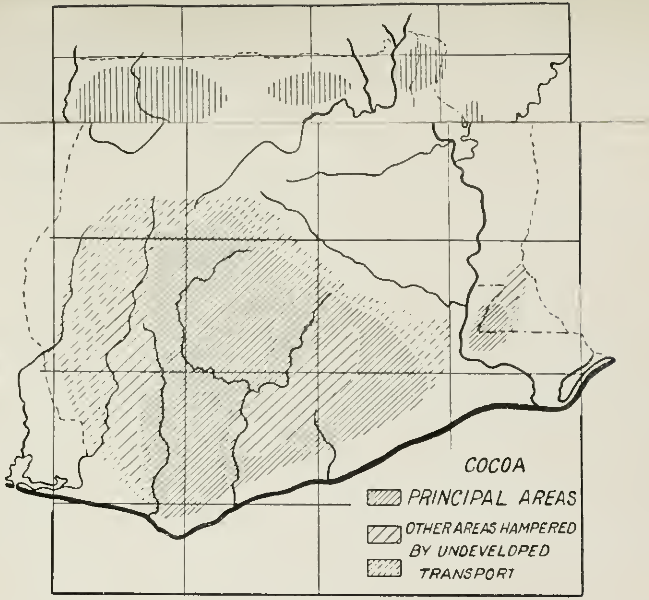
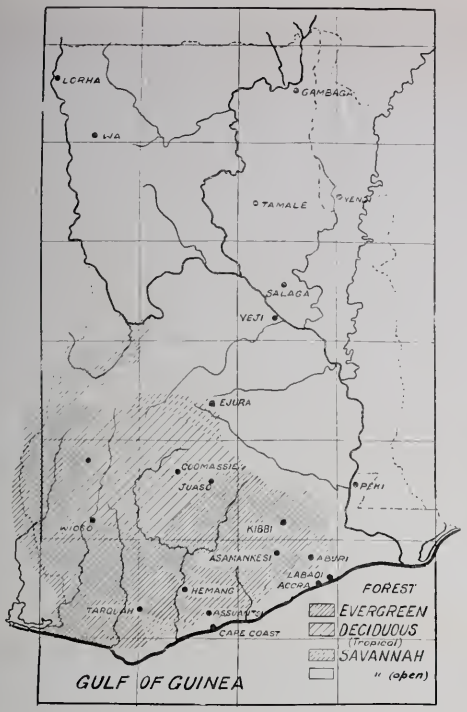
| | | 1920. | 1921. | 1922. |
|---|---|---|---|---|
| * Exports : | Gold and gold dust | £889,248 | £855,097 | £889,204 |
| | Manganese ore ... | £68,019 | £12,394<br>(7,195<br>tons). | £106,031<br>(61,279<br>tons). |



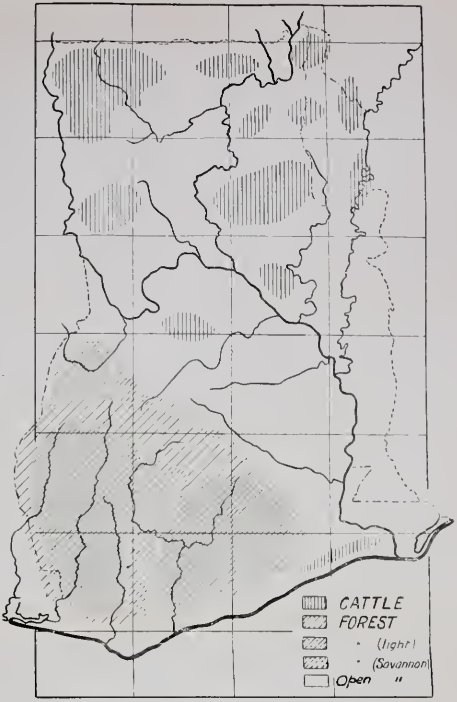
Map. 6. Principal Oil Palm and Shea Butter Areas.



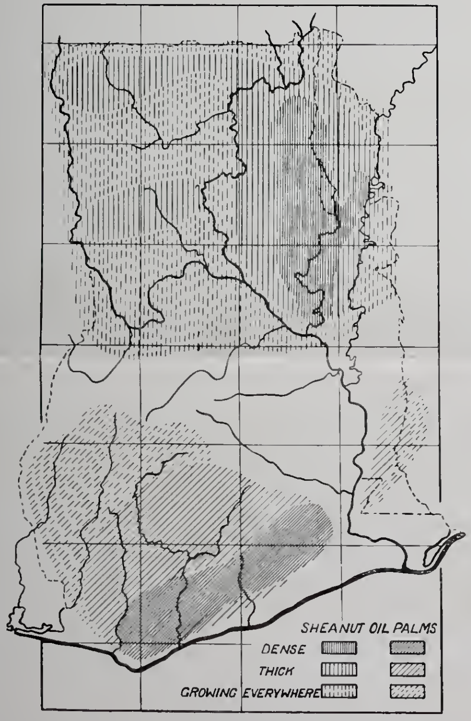
Map 7. Cocoa Areas.



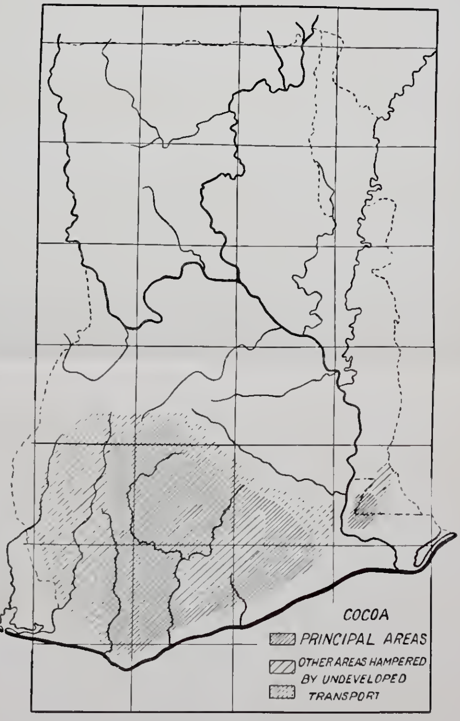
Map. 4. Natural Vegetation and Agricultural Stations.



Map. 5. Principal Timber and Cattle Areas.



Map. 6. Principal Oil Palm and Shea Butter Areas.



Map 7. Cocoa Areas.

for three years and then abandoned for seven, 5,624 square miles would be required for the forest inhabitants. Some 800 square miles are under cocoa, while the area of kola and oil palm within the forest, together with the food farms which supply the large centres, as Accra and Cape Coast, bring the total to, say, 7,000 square miles. It is estimated that the railways and mines might continue to be served by 4,000 square miles, though the clearing of the deciduous forest and of the steep hill sides may lead to deforestation in spite of all attempts to prevent it. There is left, therefore, some 17,000 square miles for merchantable timber, but of this 5,600 square miles is swamp forest or other non-merchantable forest. It leaves, therefore, a balance of only 11,400 square miles of merchantable forest. This might be preserved by a sound policy of forestry, though there is already a recognition that the natural conditions in this part of West Africa are so finely adjusted that future prosperity or disaster are at present in the balance.* Chipp states: "There can be no doubt that ultimately, if unchecked, the whole of the forests of the Gold Coast will disappear, as they have already done in Sierra Leone and Togoland. Apart from the loss in forest wealth to the country that would be entailed, it would also mean the practical disappearance of the cocoa, kola and oil palm industries as commercial ventures."[8] Brooks, reasoning from what appears to be a steadily diminishing rainfall, points out that the cocoa plantations on the slopes of the Aburi-Akwapim hills, facing the coastal plain, are doomed to destruction at an early date on account of a steadily diminishing rainfall, which also is resulting in an alteration of the character of the natural vegetation from the evergreen to the deciduous type.[5] At present between 80 and 90 per cent. of the annually produced wealth of the Gold Coast comes from agricultural products, and 75 per cent. of the total exports are cocoa, of which the average value during the past three years has been over

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| | | 1921. | 1922. |
|---|---|---|---|
| * Exports : | Timber ... ... | 1,351,648 cu. ft<br>(£203,343) | 2,479,929 cu. ft.<br>(£254,384) |
| | Palm kernels ... | 1,651 tons.<br>(£30,820) | 3,155 tons.<br>(£46,449) |
| | Palm oil ... ... | 67,448 gals.<br>(£7,717) | 210,364 gals.<br>(£20,010) |

£7,500,000.[*] A government report[9] states: "It cannot be too frequently repeated and emphasised that should the valuable cocoa industry be lost to the Gold Coast, a long time must elapse before any other industry approaching the same magnitude and value could take its place. Indeed, I know of no other crop which could be grown so eminently suitable to the tastes and inclinations of the people that would normally bring in so much money in proportion to the labour expended upon it. It behoves us, therefore, jealously to guard and guide this valuable asset, the loss of which must inevitably have most serious consequences."

There are, however, large areas where soil and other conditions are unsuitable for cocoa. Here it is essential, in the interests both of trade and of the prosperity of the African, to explore the possibility of other forms of production. Accordingly, commercial coconut plantations are being experimented with on the sand bars and lagoon shores of Eastern, Central and Western Provinces, since this is a product which grows well in these districts and its cultivaton and the preparation of the copra fits in well with fishing, the principal occupation of these villages.[†]

Other development schemes are:—

(*a*) The development of a sisal plantation of 1,000 acres on the Accra plains.
(*b*) The development of rice, ground nuts and food crops.
(*c*) Investigation of possibilities of sugar production.
(*d*) Consideration of ways and means of reviving and developing the oil palm industry.
(*e*) Preliminary investigation of the possibilities of developing the production of shea butter in the Northern Territories.
(*f*) Prospects of utilising locally grown products in the production of power alcohol.
(*g*) Improvement and development of stock farming beyond the limits of the forest zone.

| | 1920. | 1921. | 1922. |
|---|---|---|---|
| [*] Exports : Cocoa ... | 124,000 tons.<br>(£10,056,298) | 133,000 tons.<br>(£4,764,068) | 159,305 tons.<br>(£5,840,743) |

| | 1921. | 1922. |
|---|---|---|
| [†] Exports : Copra ... | 443 tons (£10,489) | 1,102 tons (£21,252) |

From all this, both the possibilities of advancement and decline may to some extent be estimated. But the future situation is really contingent on the manner and extent to which the African adjusts himself to the new environment and seizes or refuses the new geographical value which the European has given to his land.[10] If it is worth the expenditure of thousands of pounds to investigate the effects of changing physical conditions on economic development, it is surely worth at least an equal sum to investigate the effects of economic development on the African people themselves.

Under the advice and guidance of the Government through its agricultural officers, fostered and stimulated by the trader through the medium of trade, innumerable cocoa plantations have sprung up in the semi-cleared bush adjacent to the villages. This has had the effect of limiting native food production to a considerably restricted area, and one which is constantly diminishing. After numerous disastrous experiences in places of insufficient food crops (in some cases no doubt due also in part to an unwise abandonment of food production in the interests of cocoa, rubber or groundnuts), systems of intensive cultivation by manures and rotation of crops have been the subject of experiment, and are slowly being adopted.[11]

The inevitable result of such capital investment in plantations and food producing areas is that the old time custom of land holding receives such pressure arising from new customs that the clash of old and new is likely to produce a revolution with all its unpleasant concomitants. So recently as 1921 Lord Selborne stated to the African Society [12]: "There is no land problem in Nigeria—at present. The land of the country is all held communely. There are variations of communism in different parts. In some places the land belongs apparently to the nation, in others to the tribe, and in others to the family; but what is interesting is that I have heard in several places, both there and on the Gold Coast, where the same is generally true, that where cultivation is becoming intense, as it is in some places, the native cultivator is becoming restless under the communal system and is reaching out for individual tenure."

Sir Hugh Clifford had previously stated: "Theoretically, all land belongs to the tribe, though, as we have seen, the family which planted a temporary food-patch was regarded as having a certain right to the fruits of its collective labour. This was a system which it was very natural for a people to evolve whose culture did not include any save shifting cultivation. The introduction of agriculture of a permanent character was to them, however, an extraordinary revolution, entailing a change not merely of degree, but of kind. If the land belonged to the tribe, and the fruits which labour wrung from it to the tiller of it, when the occupation by the latter ran into a long period of years, instead of lasting only for a season or so, what became of the communal property in the soil? The Twi-speaking native States are governed on very democratic principles, which include the right of the people to depose a chief if his personal or public conduct does not meet with their approval. The position of the planter of a cocoa-garden *vis-à-vis* the tribe was a matter in which the popular will supported the individual, as against the community, for very soon the vast majority of the tribesmen were themselves the planters of cocoa-gardens. Immemorial custom might say one thing, but immediate and personal interests said another, and that in tones that would take no denial. Accordingly, though the theory of the communal ownership of all land stands as four square as ever, in practice the property of the individual in his cocoa-trees is fully recognised, and it passes on his death to his next-of-kin with the rest of his personal effects."

Again, it is reported that "owing to the rapid development and the sudden realisation of the actual value of land, appeals from native tribunals as to ownership of lands have increased considerably."[14]

In view of these and other changes, it is not to be wondered at that some old chiefs and elders shake their heads, and think their country is going to the dogs and their young men to the devil.

May be the village would survive the shock of a change in the character of land holding, did not success in cultivation bring in its train a new and greater danger. Human porterage breaks down completely when tons instead of pounds of produce need to be transported, and surf boats—those frail cockle shells that ride the surf on even chances of getting through—are scarcely adequate, on the one hand, to convey heavy, bulky and voluminous cargoes, or, on the other, to reduce insurance rates to a profitable commercial figure—at least to the trader.

All kinds of public utilities clamour for their realisation. Roads, railways, harbours, waterworks, and modern town-planning, both for European and African, need to be undertaken. For these native labour must be obtained. The regularity of hours of labour, the change from tiller in his own interests to wage earner working for the interests of someone else, above all the slow but sure dissolving of the kith and kin bond and the creation of craft bonds in trades unions, all these are tending to complete the break up of the old social organisation. Though private ownership, wage earners, trades unions and such like are part of our civilisation and seem more or less reasonable, they are innovations carried unconsciously by the channels of merchandise and are tempestuous upheavals to those who in their youth saw the stool as emblem of tribal organisation, and in their old age see its desecration metaphorically, and in the case of Ashanti, literally,[15] and yet feel the impotence of the small boy who sees the mighty ocean roll in, and after one or two gentle lappings round his castle of sand, sweep it away without an effort.

Map 1 shows the framework of motor roads and railways upon which the more effective transport is being developed. The great difficulty on all these communication lines is the disastrous effect of the tropical storms which in the wet season flood or wash away the roads, weaken railway embankments and endanger bridges, and in a thousand and one ways set restrictions upon the free activities of rail or motor transport.

The greatest difficulty of all, however, lies in the transhipment of goods at the ports. The shallow waters breaking under the swell and current in line upon line of surf not only compel the ocean vessels to stand off in the open roadsteads a mile or two from shore, but make it extremely difficult for surf boats to handle satisfactorily or expeditiously the ever-increasing cargoes thrust upon them. At Seccondee a natural breakwater has been utilised to facilitate the construction and use of a jetty; while an artificial breakwater at Accra has helped slightly in a similar way. A project is now under way for the construction of a deep water harbour at Takoradi, where several liners may discharge and take on cargo directly from the wharves, at least in calm water, from lighters.[16]

The Takoradi scheme has met with much support and much adverse criticism. Cape Three Points forms a great breakwater of the order of the Guinea Coast, so that while to the west of the Cape and east of the river Prah the silting of the rivers and the coastal waters makes such ports as Axim, Accra and Quittah difficult of access, this central portion has a rocky coast with little sand or evidence of silting. Takoradi has been selected as the best site for the premier port of the Colony. The full scheme, at an estimated cost of £5,000,000, could be completed about 1928. The work, however, is proceeding by stages, and that now in hand will be completed in about two years' time. The full project would give about 6,000 feet of wharfage, including facilities for the handling of coal imports and ore (manganese) exports.

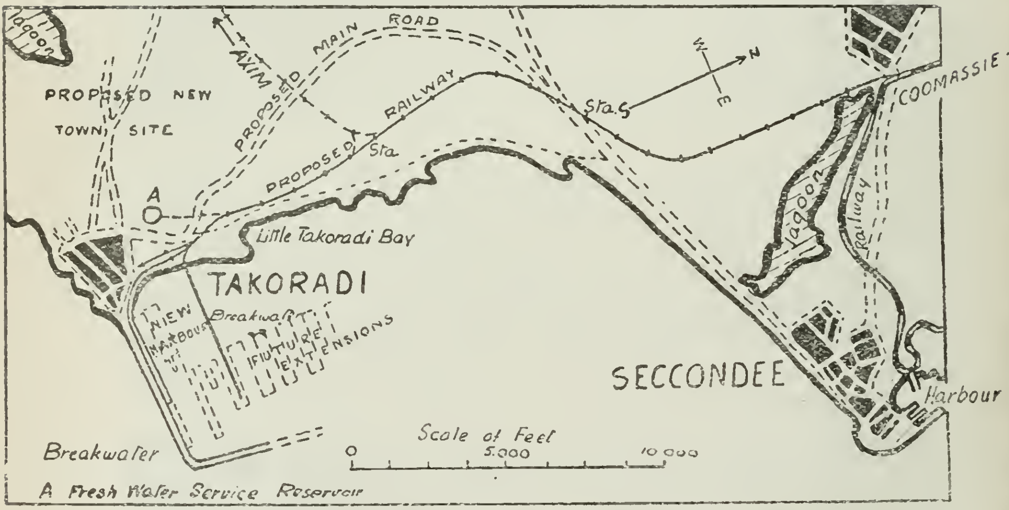

Fig. 8. Plan of Takoradi Harbour Scheme.

While this is in proximity to the gold and manganese ore districts in which British interests are dominant, it is difficult to see how it will assist to the same extent the native commercial interests—largely in cocoa—which centre round the plateau country traversed by the Accra-Koforidua-Coomassie line.

Everywhere are the evidences of great things afoot, developments which have warranted and necessitated the thorough survey and the production of maps on the scale of 1:125000 showing by a useful and elaborate system of symbols the various features of topography, and the areas and kinds of mineral and vegetable production.[17]

The essential concomitant of a survey of natural conditions and possible developments is the study of the effect of these changes on native life. In general, they are being educated by their contacts through administrator, missionary and trader and their works. In certain directions they have caught the spirit of Europe. Native farmers, on their own initiative, seek to improve means of communication, there is an extension of the co-operative association movement, and an agricultural and commercial society has been formed. Undoubtedly they are learning from Europe, and on the kind and the result of that education depends the future of the Colony. The Report of an African Education Commission[18] is most valuable on account of the data and advice it gives. Thus it gives (p. 130) the following statistics:—

| | | | | |
|---|---|---|---|---|
| Government and Assisted Mission Schools in 1919 ... ... ... ... ... ... | 216 | with | 27,500 | scholars. |
| Small Unassisted Schools ... ... ... | 250 | „ | 7,500 | „ |
| Total ... ... | 466 | „ | 35,000 | „ |

Estimated number of boys and girls of school age, 300,000. The distribution of the schools is also instructive:—

| | Area. sq. miles. | Pop. | No. of Schools. | No. of Scholars. |
|---|---|---|---|---|
| Gold Coast Colony... | 24,000 | 1,143,000 | 186 | 25,000 |
| Ashanti ... ... | 20,000 | 407,000 | 23 | 2,600 |
| Northern Territories | 36,000 | 527,000 | 4 | 225 |

The distribution within the Colony itself is interesting:—

| | Pop. | No. of Schools. | No. of Scholars. |
|---|---|---|---|
| Eastern Province .. ... ... | 594,000 | 119 | 15,000 |
| Central Province ... ... ... | 335,000 | 45 | 7,000 |
| Western Province ... ... ... | 214,000 | 22 | 2,500 |

This distribution of educational facilities and development needs to be carefully correlated with the commercial developments of non-native enterprises (mining and lumbering) in the west over a very long period and the native developments (cultivation and plantation) of quite recent times.

Although extensive educational facilities are provided, at present they are scarcely the facilities required by an awaking people, or perhaps, one might say, of a people being violently uprooted from their age long traditions and customs and left to strike root again as best they can under circumstances which keep them in a constant state of agitation. Education is instruction in those things which the tradition of the race has determined by experience are best for culture and true citizenship. By this test it would appear that not only in material things are there equal chances of prosperity and disaster through avoidable and unavoidable causes, but in the higher things of life, the same ignorance of the effects likely to follow certain lines of action or policy, gives the same narrow margin between the Gold Coast as a healthy partner of the Empire and the world, and the Gold Coast as a leader of some pan-African or pan-negro agitation begotten of a real or fancied grievance in the new conditions. Here, as elsewhere, a trained and impartial observer is required who, not wearing the "blinkers" of some particular interest—native or foreign, can see the problem of the country as a whole. It is a subject requiring careful study by the highest intellects. Thousands of pounds will be spent on watching the movement of the proboscis of a mosquito in the interest of tropical medical science, but it is thought to be wasteful expenditure to watch intently the movements of a whole social group in the interests of humanity. The missionary preaches the Gospel, the government administers the law, and the trader provides the goods—all in the interests of the native; but the synthesis of all these activities which represent the unity of life and living is apt to be neglected. If this sounds in the ears of the merchants of Britain too much like laying up treasure in heaven, it actually will produce treasure upon earth. Culture and comforts go together. As the peoples of tropical Africa will show the greatest relative cultural advance within the next few decades, so they constitute the greatest potential market of modern times.* But it is a market where the

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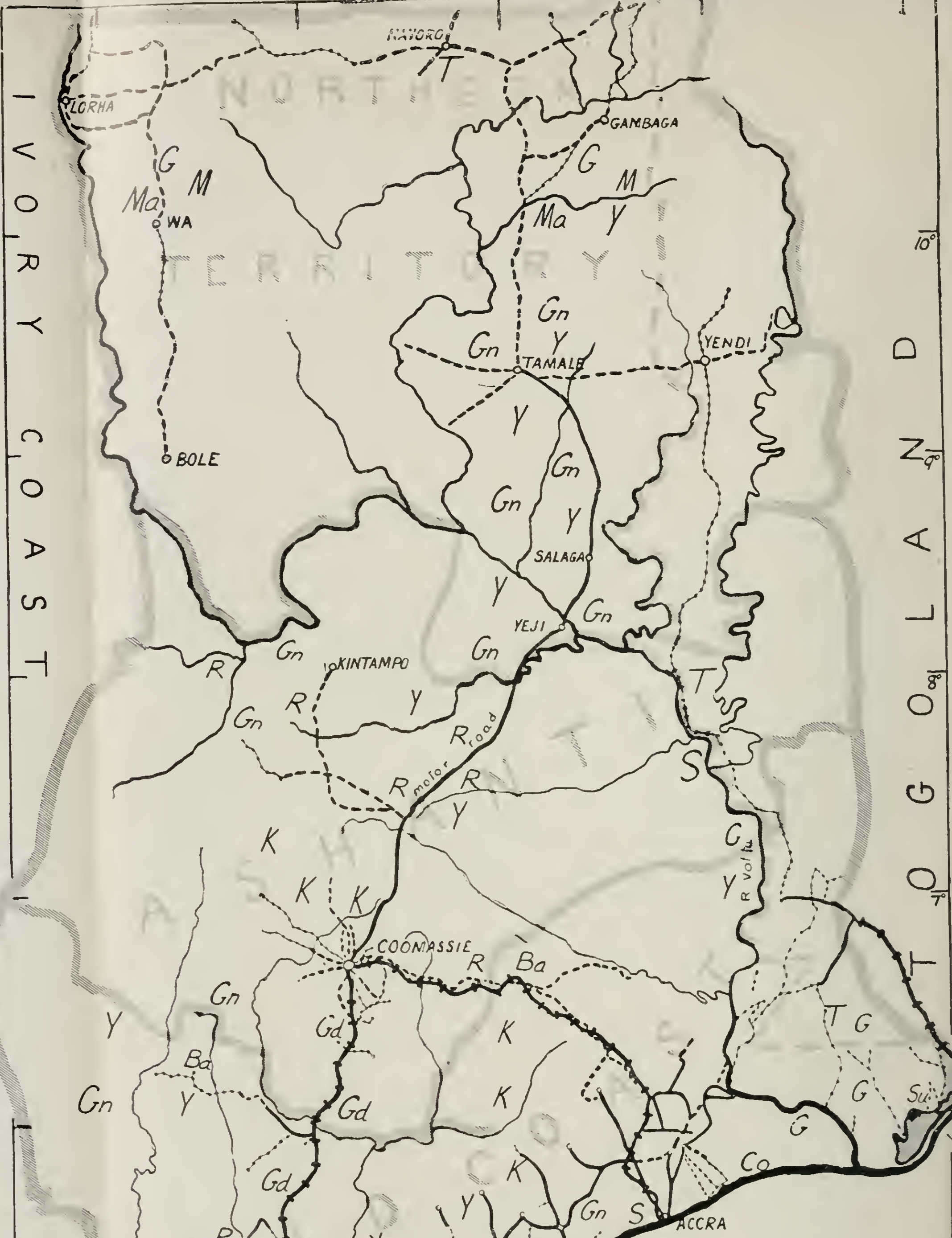
* This is specially true for the cotton trade. The West African purchases a fairly high grade of material. In 1920 the Gold Coast took in cottons 10,000,000 lbs. in weight (£3,799,000); in 1921, 2,604,000 lbs. in weight (£911,000).



Map. 9. Roads, Railways and Economic Products. Ba Bauxite, Co Copra, G Guinea Corn, Gn Ground Nuts, Gd Gold, K Kola, M Millet, Ma Maize, Mn Manganese, R Rice, S Sisal, Su Sugar, T Tobacco, Y Yams.

merchant requires to know the people and not the people to know the merchant and his goods. Sooner or later it will be realised that on all counts it will be as profitable, if not more so, to observe the region as a geographical unit as it is to observe whether cotton will grow in tropical soil. The future of tropical Africa rests primarily with the African and not the European, though the European (or American) will gain enormously from the increasing prosperity of the African. Optimism of the material advancement of the Gold Coast needs a corrective of the African himself, whilst the appended table shows that optimism in British trade there requires to take into account the new trade connection with the United States, a movement not unconnected with the "boom" of geographical studies in America during the last few years.

It is in order that the foundations of the new epoch may be well and truly laid that the present Governor, Sir F. G. Guggisberg, has pressed for a sound educational policy which, if projects become realised, will be crowned by a University at Accra with 3,000 to 4,000 students whose research work will be on the numerous problems in all fields of study arising from the new material and spiritual conditions developing on the Gold Coast.

## APPENDIX.

### TRADE IN 1922.

Imports, £7,900,539. Exports, £8,335,400.

Trade percentages:—

| | Imports. | | Exports. | | Total. | |
|---|---|---|---|---|---|---|
| | 1913. | 1922. | 1913. | 1922. | 1913. | 1922. |
| With U.K. ... ... | 69.99 | 75.76 | 64.77 | 42.26 | 67.26 | 58.56 |
| Brit. W. Africa ... | | 5.09 | | 4.04 | | 4.55 |
| U.S.A. ... ... | 5.09 | 8.86 | 1.86 | 25.61 | 3.4 | 17.49 |
| Total Brit. Empire | | 81.04 | | 46.35 | | 63.22 |
| Total Foreign Countries | | 18.96 | | 53.65 | | 36.78 |

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See also (i) *Colonial Reports* for 1920 and 1921 for the Gold Coast, Ashanti and the Northern Territories, and (ii) Handbook of the Gold Coast (1923).

# HUMAN GEOGRAPHY: FIRST PRINCIPLES AND SOME APPLICATIONS.

By Marion I. Newbigin, D.Sc. (Lond.).

(The Presidential Address delivered to the Geographical Section (E) at the Hull, 1922, Meeting of the British Association for the Advancement of Science.)

In his address to this Section in Edinburgh last year, my predecessor, Dr. Hogarth, devoted some time to a consideration of the position of geography in the Universities of this country. He had no difficulty in showing that, from various points of view, this position still leaves much to be desired. My present concern, however, is not with the actual facts, but with a deduction which naturally follows from them. If it be true that the Geographical Departments of the Universities are, in most cases, insufficiently staffed and equipped, then it is surely clear that, despite all the progress which has been made in recent years, we have largely failed to convince the great mass of educated opinion of the value of our subject. For University chairs are only endowed, and departments equipped, when those established in educational high places realise the growing importance of the subject concerned. Usually, also, before that realisation can take place there must be a driving force in the shape of a body of enthusiasts, able and willing to convince the general public that the advance is necessary in the interests of the community.

Now, in the case of geography the body of enthusiasts does exist; where we have failed, as I think, is in making continued and determined efforts to convince others. The time seems to me to have come for a determined missionary effort, a deliberate attempt to make clear to the ordinary citizen that geography, in its modern aspects, is a subject of direct interest and value to him in his daily life.

Let me take first a single minor example of the need for such a policy. All those who have had anything to do with the arranging of lecture programmes for geographical societies are aware how largely accounts of exploration bulk in these.

It may be said generally that any Committee meeting for such a purpose turns first to a consideration of what returned explorers are likely to be available at the time. More than this, whether geographers in the technical sense are well represented on such bodies or not, there is a general consensus of opinion that an explorer who has come through great dangers, or shown conspicuous personal courage, is, for a society which depends on public support, a much more valuable lecturer than one who has merely done careful and painstaking work, with no element of drama in it.

This means that even that section of the public sufficiently interested in geography to join a geographical society regards the subject as primarily concerned with exploration, leading to the description of the unknown or little-known regions of the earth. Even so, its interest requires stimulation by the personal factor. If this be the attitude of a somewhat specialised public, what is that of the world outside?

I do not think there can be much doubt as to the answer. In so far as that public is highly specialised and consists of students either of those separate sciences from which geography obtains much of its material, or of such subjects as history in its different branches, it tends in many cases to regard geography with tolerant contempt. Of the unspecialised public it may be said generally that the subject in its modern developments has scarcely come within its range of vision. Its older members, especially, are for the most part convinced that they learnt "geography" at school, as they learnt reading, writing, and arithmetic there, and that, since mountains and rivers, capes and bays and the rest remain where they were, there is little left to be studied or investigated.

It seems to me, therefore, that the most clamant need at the present time is a continuous attempt to make it plain to the community at large that the main interest of geography is not in its facts as such—for if geography ceased to exist the geologists, meteorologists, botanists, zoologists, and so forth would continue to collect most of these. Rather does it lie in the way in which the geographer studies these facts in their relations to each other and to the life of man. Further, whatever place the study of the human response to the surface phenomena of the earth should take in the subject considered as a whole—and the topic was fully discussed by Dr. Hogarth last year—there can be no doubt that it is the aspect which makes the widest appeal. When, for example, we can take the sheets of a good atlas of physical geography and show that the facts represented there can be made to yield deductions of great interest and value to everyone, then we are going far to persuade the members of the public of the importance of geography; and not until they are so persuaded can we hope that the subject will obtain in the higher institutions of learning the position to which we believe it is entitled.

Now, I am well aware that such deductions have been and are being drawn by geographers, both at home and abroad. But their conclusions have so far reached only a very limited audience. It has seemed to me that an Address to this Section gives an opportunity of discussing certain interesting points of view which do not seem to have been fully treated hitherto. In so far, however, as I am addressing an audience of geographers in the technical sense, I wish it to be clearly understood that what I have to say is to be regarded less as a contribution to geographical science than as an attempt to carry out that forward policy which seems to me essential at the moment. Even if I fail to carry you with me throughout, I may at least hope to stimulate some of you to promote the aim already set forth by other and better methods.

For the reason already given I propose to take certain points in regard to the human response to surface phenomena for special consideration. Now, it is a somewhat curious fact that, although geographers are agreed that man's intelligence and power of acquiring and transmitting knowledge so differentiate him from animals that it is necessary to distinguish between human geography and animal geography; yet, so far as I am aware, little detailed consideration has been given to the question as to the respects in which his response to environmental conditions differs from that of the animals. This is unfortunate, more especially since, thanks to the biologists, we have a fairly clear idea as to the mechanism of the response in the latter case.

If, for example, we take two familiar animals, such as the rabbit and the common hare, we find that, though belonging to the same genus, and generally resembling each other in structure, they show certain minor differences in bodily form and habits fitting them for the environments in which they respectively live. Thus the long legs of the hare enable it to maintain the swift movements upon which it depends for escape from its foes, while the rabbit, inhabiting sandy upland instead of open country, finds safety underground, and need only be able to move swiftly over short distances. Similarly, the young of the rabbit, born within the shelter of the burrow, are more helpless than the leverets, brought forth virtually in the open. The biologists are broadly agreed that these differences are an adaptive response to the different environments of the two animals. In explaining the origin of that adaptive response, most of them lay stress on the two factors of fixation to a particular environment and isolation—actual or physiological—within it, so that incipient variations are not swamped by intercrossing.

Now when we turn to look at man, two facts are at once apparent. In the first place, at the present time, he does not appear to respond to environmental influences by adaptive modifications of bodily form. Secondly, there was certainly a time, before he had come fully to his heritage, when he did so respond. We know this because the anthropoligists are agreed that while man once ran into a number of species—and of genera—now all living human beings belong to the same species, and even the races show marked signs of being in process of becoming swamped by intercrossing. In other words, there was a time when there was no human geography, when men reacted to the sum total of the conditions as an animal does; but that time appears to have largely passed.

But there is certainly still a human response to environmental conditions. What precise form does it take? To a certain minor extent, apparently as an inheritance from what I regard as essentially the pre-human period, there is a direct structural response. One need only mention the presence of peoples with thin, almost unpigmented skins in Western Europe, and the tendency to increased pigmentation alike as the Tropics and the Poles are approached. But though determined efforts have been made to correlate in detail the physical characters of the great races with the climate and relief of the areas where they are presumed to have originated, most of these correlations remain uncertain and speculative.

Man's real response to the surface phenomena of the earth takes the form of a communal, not an individual response. It is the aptitudes which the members of a community display, the tools which they use, the kind of knowledge which they accumulate, their modes of organisation, their type of material wealth, their traditions and ideals, which show the environmental imprint most closely, far more closely than the colour of their skins or the shape of their heads.

But when and how did the change in the two modes of response come about? To answer this question let us recall what has been already said as to the importance of fixation and isolation in the case of animals. The surface of the earth is almost infinitely diverse, and what the biologists call natural barriers, the major barriers like deserts, seas and mountain chains, or the minor ones produced by the transition from one type of plant formation to another—*e.g.*, from the forested river valley to the grass-covered upland—separate different types of environment, and form obstacles to the distribution of most land animals. There must have been a time when groups of men, no less than the pigs in the forest or the asses on the steppe, were firmly gripped by the physical conditions, were isolated from other groups, forced to become fitted by structure and habit for a particular set of conditions, or to die out. But with his growing intelligence man escaped from this iron grip, learnt to make virtually every part of the surface yield enough for survival, proved capable of overcoming every kind of natural barrier. When this occurred the old mechanism of adaptation largely—though not completely—ceased to work. Evolution then might have ceased also, man might have become specially fitted to no environment because fitted for all, if the factors of fixation and isolation had not, in quite a different fashion, obtained a new hold.

He ceased, save in relatively few parts of the earth's surface, to be a continuous wanderer. He settled down afresh on particular parts of it, and there learnt to use his increasingly complex brain not only in utilising to their full the natural resources, but also in modifying the local conditions so that new resources became available. In other words, I wish to suggest that the cultivation of the soil was the great agent in ensuring the new type of fixation to a particular area which once again made evolution possible. But evolution now took the form of increasing development of communal life, or, in other words, the growth of what we call civilisation is the precise equivalent of specific differences in plant or animal

Further, just as, in the case of the animal, isolation is necessary before an incipient species can become fixed, so in the case of human communities a measure of protection from the inhabitants of neighbouring areas—a measure, that is, of isolation—is essential before civilisation can develop.

Again, in the case alike of plants and animals we know that where the local conditions are such that the incipient species is limited to a very narrow area, there highly specialised forms of adaptation may occur, as they do, for example, on many islands, or in isolated mountain chains; but that specialised type of development is associated with the loss of the capacity to vary, to acquire adaptations fitting the organism for a wider area. So in the case of human communities, where the isolation is too complete the power of adaptation tends to be lost, and such groups, though their civilisation may, along its own lines, be of a highly specialised type, are easily overwhelmed when contact with the outside world does occur, just as island animals tend to disappear before introduced forms.

Now with these general statements as starting-point, let us consider some facts in regard to the development of civilisation in Europe and the margins of the adjacent continents.

In this area history has seen three successive great foci of civilisation, each based on well-marked and distinctive geographical conditions. The development of the three types has been successive and not simultaneous, and there has thus been a steady shift in time of the main focus, a shift westward and north-westward. The three types of human societies alluded to are, of course, (1) the river valley type as represented in Babylonia and early Egypt; (2) the Mediterranean type on parts of the seaboard of the Midland sea; (3) the forest type of Europe proper, itself becoming progressively more and more influenced by the greater ocean to the west, so that forest influences have steadily given way to maritime ones.

We have to ask ourselves, then, what effects the factors already considered have had on the origin, growth, and further development, or decay, of each of these three. In other words, what in each case were the geographical causes which first fixed man to a particular area in which he was able to cultivate useful plants? What gave the necessary isolation and safety during the early stages? Finally, to what extent were the conditions such as to give that necessary safety without leading to the loss of the power of continued adaptive modification, as expressed either in the capacity to spread over adjacent areas showing progressively increasing differences, or in that of responding to changes within the home area?

In the case of the river-valley areas, as represented in the Tigris-Euphrates region and the Nile valley, and in that of the Mediterranean seaboard, several geographers, among whom Prof. Myres may be especially mentioned, have discussed the conditions favourable to the early development of civilisation. It is therefore not necessary to consider the geography of these areas in detail. But, beginning with Babylonia and Egypt, I should like to put the causes which seem to me to have promoted fixation quite briefly. Among them we must certainly include the primitive natural resources, scanty though these doubtless were. The birds of the valley marshes, the relatively small number of mammals, the fish of the rivers, must have supplied a certain amount of animal food. The date palm, in the Tigris-Euphrates areas at least, would, even in its wild state, doubtless yield a fruit of some value in the very early days.

But as an important factor in the development of cultivation, I would lay especial stress upon the presence of what the botanists call the "open" plant formation. Native trees, as we know, are very few, the date palm, one of the most characteristic, being strictly limited in distribution by its need for water at the roots. For the greater part of the year the ground between the scattered trees is naturally either devoid of vegetation, or this is represented only by a few desert plants. But after the periodic flooding by the rivers, an abundant growth of vegetation springs up. The plants may be annuals, whose seeds ripen as the ground dries, and lie dormant till moisture comes again; or they may be bulbous and tuberous forms, having but a short period of vegetative activity, but possessing underground stems capable of withstanding prolonged drought. The result is that man did not require to clear land for crops, Nature periodically cleared it for him. He had but to make the fairly obvious deduction that water alone was necessary for the apparently barren soil to blossom like the rose, and from all the choice of plants which the flooded ground offered, to pick out those of some use to him, and learn to suppress the rest. As has often been pointed out, he did not need to trouble greatly about renewing the fertility of his lands, for the flood-water did this for him.

So soon as he had learnt the initial lessons of cultivation, he was tied to the area normally flooded at certain seasons, or to which he could lead the flood-water. He intercalated his crops along one of Nature's lines of weakness, in a transitional area which passed periodically from one climatic zone to another, being, according to the seasons, either a desert or fertile. Fixed in this fashion he could, and did, adapt his mode of life to the natural conditions as precisely as ever bird or insect became structurally fitted for life on an island.

The bordering desert ensured isolation, and, continuing the island metaphor, we may say that it represented the sea. Its effect was to throw the whole energy of the community towards the centre, for the periphery formed an area in which the characteristic mode of life could not be practised. Similarly, it gave protection, for it is unsuited to any save a highly specialised culture, which must have been of relatively late origin. So far as it formed the boundaries of the incipient state, therefore, the desert constituted a barrier preventing the ingress of potential foes. In neither case, of course, was the desert rim complete, and the conditions upstream varied in the two areas, and were, as has been often pointed out, from the point of view of safety, on the whole less favourable in the case of Babylonia than in that of Egypt.

As to the third point, it is, I think, easy to show that while the isolation of the areas was markedly conducive to the rise of civilisation and to its growth up to a certain point, in the long run it became a danger. In the first place, the contrast between the belt which could be watered and that to which, with the means available, water could not be carried, was exceedingly sharp. There was little possibility of a gradual spread into areas becoming slowly but progressively different, where new aptitudes could be acquired, new experience gained, and new forms of wealth stored. Specialisation was high within the favoured tract, but the limits set by Nature could not be passed.

Again, as has often been noted, the conditions led necessarily to a centralised and imperialistic form of social organisation. If there was a sharp line of demarcation between the areas which could and could not be watered, there were great possibilities in the direction of extending by artificial means the belt over which the flood-water spread. This involved the gradual growth of an elaborate irrigation system, and for the maintenance of this a centralised power was essential. This brought with it, as a correlated advantage, the possibility of organised defence when developing neighbouring communities attempted to encroach. But if the attack was made with sufficiently powerful forces, the centralisation became a menace. An attacking foe able to destroy or damage seriously the irrigation system could cut off at its source the basis of prosperity, and render reconstruction on the old scale almost impossible. In other words, the community became adapted to artificial conditions created by itself; if and when those conditions were destroyed, the survival of the old culture became impossible.

Turn next to the Mediterranean region, that is to the area in which the typical Mediterranean climate prevails. In so far as the native plants are concerned, this area shows certain broad general resemblances to the river valleys, with some striking differences. Thus the characteristic plant formation is alternately open and closed; closed during the cooler season of the year when the winter rains cause a brief but intense growth of annuals and bulbous or tuberous plants, open during the drought of summer when the trees and shrubs stand apart from each other with bare earth between. But the contrast is due, as indicated, to the rainfall conditions, not to flooding. There is thus no natural renewal of fertility, and plants which require much water can only thrive in the cooler season, so that growth is less intense than in either the Nile or the Euphrates-Tigris valley.

On the other hand, because of the climatic conditions, trees and shrubs, alike as regards individuals and species, are far more numerously represented in the Mediterranean region. Here, however, we come to a very curious fact, which, although it is familiar enough, does not seem to have been considered in all its bearings. This is that, despite the (relative) wealth of native species of shrubs and trees, those which are cultivated seem to have been for the most part introduced. This is apparently true even of the supremely important olive. The tree occurs in the fossil state, and the olivaster of the maquis is believed by many to be truly wild, not feral. Yet it would appear almost certain that the *cultivated* olive was introduced, into Europe at least. The same thing is true of great numbers of other species, and of all the fruit-bearing trees now grown in the area there are few indeed which can be reasonably regarded as having originated there as cultivated forms.

Now, the deduction that I would draw is that the Mediterranean area is one in which lessons first learnt elsewhere could be easily practised, but one rendered unsuited by the natural conditions for the taking of the first steps. Putting the point in another way, I would suggest that when we see, in any part of the area, olives or fig-trees rising from above a plot of wheat or barley, we have to say to ourselves that this is an adaptation to a new set of conditions of the *type* of cultivation first practised on any scale in Babylonia or Egypt, olive or fig representing date palm and the accompanying trees, the narrow plot of corn the local modification of the broad fertile fields of the river valleys.

Man was doubtless first attracted to the area, as in the case of the river-valleys, by the natural resources, small though these must have been, even with the addition of the sea fisheries. He became fixed to it when he learnt that the hill spurs gave safe sites for settlements, while affording easy access to the slopes on which his special form of intensive cultivation could be carried on. That form, as already suggested, was a derived and not an original one. He replaced the native trees and shrubs by useful cultivated varieties or species, which had, certainly for the most part, originated elsewhere. He intercalated short-lived annuals like corn crops and beans along the line of weakness indicated by the periodic opening and closing of the natural vegetation. But one of his great difficulties was always that the absence of much level land and the climatic conditions rendered the growth of such crops relatively difficult, much more difficult than in the river-valleys.

If we think of the early settlements as showing a general resemblance to the Berber villages of the Algerian Atlas to-day, we realise that they were more or less isolated the one from the other, so that the social polity was of a wholly different type from that existing either in Babylonia or in early Egypt. But, and this seems to me important, although the natural conditions—especially the fact that fertility was limited to certain areas—made a measure of isolation inevitable, yet the sea gave a possibility of free movement in all directions which was absent in the river-valleys. Thus oversea, if not overland, spreading could take place, and the changes in the geographical conditions as the sea is traversed westward are relatively small, not outside the limits of adaptation. Thus we have the spread of the higher forms of Mediterranean culture from the eastern end of the sea towards the west, with the founding of new settlements of generally similar type to the old. Greece could, and did, send daughter colonies to Sicily, and those colonies broadly repeated in their new homes the conditions which they had left in their old. This possibility of free movement brought with it a wider range of adaptability, a constant willingness to profit by new experiences, which has proved of enormous value to the world at large.

But with all its advantages the Mediterranean area, as already stated, had the great disadvantage that bread-stuffs were difficult to produce in quantity. Two methods of getting over that difficulty could be and were practised. For example, the ancient Greeks, having, it would appear, learnt the lesson from the Phœnicians, dared, in course of time, to descend from their hill-spurs to the sea coast, in order to supplement the scanty resources of their limited lands by sea trading. After a long interval the mediæval cities, especially of Italy, did the same thing on a greater scale and with the advantage of a wider market. Between the two periods Rome tried the other possible method, that of holding in subjection the areas, outside that of the characteristic climate, which were corn-producing. Her failure was, at least in part, due to geographical causes. The great advantage of the method of sea-trading was the increase in the power of adaptation which it brought, as a result of the continual peaceful contact with other lands and other peoples. The decay of the splendid mediæval cities of Italy came when the Mediterranean ceased to be a great highway of commerce, and the vivifying breezes from the outside world which had swept through it took another course—once again, that is, a civilisation based upon a delicate adjustment to a particular set of conditions fell when those conditions changed.

Let us turn next to the third great area where, comparatively late, a complex civilisation grew up, that of the forest belt of Central and Western Europe. Here the conditions appear relatively so unfavourable that man could scarcely have solved the problem of fixing himself permanently to particular areas, and adapting himself to them, were it not for the help of the experience gained elsewhere. The great agent in transmitting that experience was, of course, first the Roman

Empire, and then the Church which was the direct heir of the empire.

The essential difficulty here was that the characteristic plant formation was the closed temperate forest. At first sight there appears to be within it no line of weakness along which cultivated plants can be intercalated, and the establishment of cultivation seems to depend upon the complete destruction of the natural vegetation, involving the slow and peculiarly laborious clearing of the forest. The significance of this is admirably illustrated by Mr. Delisle Burns, when, in his *Greek Ideals,* he contrasts Aristophanes' laudation of the agricultural life in the *Peace* with that of the free and noble life in the forest as set forth by Shakespeare in *As You Like It.* In the one case the fig-cakes and the figs, the myrtle and violets by the well, the olives, the beans, the barley and the grapes, the rain which God sends after the sowing, which are the elements in the picture, all speak of man's age-long endeavour to mould Nature; but the merry life under the greenwood tree speaks of a thin scattered population, still finding, in theory at least, that Nature unaltered yields all he needs.

Had the temperate forest been in point of fact as continuous as we are apt to assume, the problem would have been so difficult that the hunter's life in the forest might have lasted much longer than it did. We know, of course, that there were always "islands" in the sea of green, and of these the most important, from the point of view of the development of cultivation, were the loess areas and the lower uplands, especially those over chalk. In the former case the friable, well-drained soil seems to have carried originally but scanty trees; clearing was therefore fairly easy, and the cleared soil proved exceedingly fertile. In the chalk uplands the local conditions made tree growth difficult or impossible, so that land was again readily available for crops or pasture.

We have, therefore, as our starting-point in this case scattered settlements in the woods—not compact ones like those of the Mediterranean region. In essentials these were doubtless quite comparable to those made by fugitive Serbs in the Shumadja, from which modern Serbia finally took origin, though the first foci were almost certainly the natural clearings already mentioned. As in the case of the Serbs, the basis of life was a combination of pastoral industries and arable farming, the pig being the most important source of animal food, and itself finding most of its food in the woods marginal to the settlement.

As to the next stages, the surrounding wood must be regarded from two points of view. Initially it formed a protection, the protective influence being strongest where the ground was ill-drained, owing to the dense thickets which covered the marshy ground. But, in contrast to both the types of region already considered, given the necessary tools for the clearing of the land, the particular type of cultivation could be extended almost indefinitely on the level, while leaving the woods on the rising ground to supply the necessary fuel, building material, and pannage for the swine. This was a great advantage, but it meant that the necessary protection was soon lost.

Now, in North-Western Europe that protective influence was peculiarly necessary for one geographical reason, as it was on the eastern margin of the continent for another. It was necessary in the west especially, because the sea-coasts, owing to the local wealth of fish, early attracted population. But in many regions those coasts, exposed to the oceanic type of climate in its most pronounced form, were unsuited to cultivation. At the same time, on account of their sheltered inlets, parts of those coasts were well fitted to breed a seafaring folk. Unable, or able only to a very small degree, to supplement their natural resources by cultivation, having at the same time command of the sea, those seafarers tended constantly to raid the painfully cleared and cultivated lands of their more fortunately situated neighbours. These, as many old tales inform us, did, time and again, find their encircling woods a protection. We must suppose, therefore, that the tendency to clear more and more land would be checked by this need for the shelter of the woods.

But it seems to me that we may regard the growth of feudalism, from one point of view, as an adaptive device by which the growing agricultural settlements obtained, at a price, the necessary protection. Feudalism in the form, for example, in which it grew up in England before the coming of the Normans was a means of ensuring the existence of a kind of organisation which permitted clearing of forest land to go on indefinitely, while diminishing the risk of perpetual raiding.

It was also, more especially in Eastern Europe, something more, for it tended to fix the cultivator to the land. The tendency to wander may be said to be almost universal in the case of forest-dwellers carrying on primitive agriculture. Its wide distribution is due to the great difficulty of maintaining there the fertility of the land, more especially when exhausting crops, like the different kinds of grain and flax, are grown. To this day, when we contrast the advanced agriculture of Western Europe with the more primitive type practised in the Eastern part, we have to remember that the Western Europeans have largely evaded their problem by using their easy access to the great ocean to draw upon all parts of the world for feeding-stuffs for their large herds of cattle, and mineral fertilisers for their arable lands. In early days the difficulty of keeping many cattle through the winter scarcity, combined with the merely moderate fertility of the deforested lands, made the restoration of material taken out by the crops a matter of great difficulty, got over by a variety of devices, including of course fallowing.

Feudalism helped in the solution of this problem by checking the natural tendency of the cultivator to abandon exhausted lands and move on to new ones. But even apart from this particular device, the problem of maintaining fertility had to be tackled early in the West, because the relief made the forest far less continuous, far less uniform, than in the East. It must have been obvious quite early that it was not illimitable. Conditions were different in the forest region of the East, where the vast, almost uniform plains, the absence of well-marked relief, the breadth of the continent, made the forest a more permanent, a more unmanageable element than in Western Europe. Here, therefore, we find in suggestive combination two peculiar features. The first is that the wandering instinct, the instinct that brought the Slavs from their eastward forest home far into Central and Southern Europe, still persists. It is said to be quite well marked in parts of Russia, despite all the artificial checks which existed under the old *régime*. Part of the difficulty of the Slav problem also lies in the fact that the effect of the habit of small groups of wandering constantly from one wooded tract to another is written large on the ethnological map.

The second peculiar feature is that feudalism, and feudalism in a very harsh form, survived here far longer than in

Western Europe, and in fact, if not in law, had scarcely disappeared when the war broke out. I would suggest that the great significance of this form of social policy here was that it helped to counteract the effects of the natural conditions, that it was fundamentally an artificial device for rendering the population stationary, and enabling it to adapt itself to the local relief and associated phenomena.

Now, whatever its value in earlier days, the present chaos in Eastern Europe shows clearly enough that ultimately it checked social evolution, and became a serious menace. It was fundamentally the erection of an artificial barrier round the rural community, and led to the apparent loss of the power of slow adaptation to changing conditions, alike on the part of the overlords and of the freed serfs.

But in the eastern chaos another factor has to be borne in mind. In the Old Russia, south of the forested area, and extending both into what is and was Rumania, lie the great treeless plains. Parts of these, as the nineteenth century showed, are extraordinarily fertile and well adapted for cereal production. But, from the point of view adopted here, they suffered from the enormous disadvantage that there is nothing in the natural conditions to fix their inhabitants to special areas, thus enabling them to acquire qualities fitting them for life there; nothing to give protection from constant inroads from Asia. Literally wastes for long centuries, these plains were for the most part ultimately incorporated in Imperial Russia, and deliberately colonised, often with colonists from a distance. The colonists were brought from areas of other characters, possessed traditions and aptitudes due to long experience of different geographical conditions, and were in the grip of a Government which had itself evolved under those conditions. There was thus no question of the possibility of the evolution of a type of culture bearing the imprint of the local conditions.

In consequence Russia to-day—as well as to some extent Rumania—is faced with a double problem. In both regions parts of the constituent lands are fitted for the mixed cultivation of the forest belt, and in them the old social policy has shown itself unfitted for modern conditions, and a new one has yet to be evolved. Other parts, again, have never developed even an imperfect social policy which was a response to their own local environment. Their apparent prosperity, till the outbreak of the war, was due to the fact that they were, economically though not politically, of the nature of colonies in relation to the industrialised West, were, fundamentally speaking, the equivalents of Imperial Rome's corn-producing lands in North Africa and the Danubian plains. The chaos in Eastern Europe is thus having a reflex disturbing effect upon the West. The West has lost an important market, but that is perhaps in itself less important than the fact that over a large tract of European land man and his environment have been thrown out of gear, a catastrophic condition which inevitably disturbs equilibrium elsewhere. Just as in the latter days of the Roman Empire disturbances in the marginal corn-producing lands shook and ultimately overthrew the centre, so are the centres of Western European civilisation to-day trembling under the impact of shocks emanating from the East. We can well understand, therefore, how it is that there are those who believe that the focus of civilisation is destined to undergo another shift, and that the day of the predominance of North-Western Europe is drawing to a close.

The subject is not one which can be discussed here. But if I may sum up briefly the points I have been trying to make, I would say that the human geographer should have before him a twofold purpose. In the first place he should strive to show that the deductions which the biologists have slowly and painfully laid down in the course of the last sixty years apply, though with an essential difference—which requires careful definition—to the life of man. Second, he should use his precise knowledge of the surface of the earth to work out detailed applications of those deductions. In other words, human geography is the biology of man, and, on account of man's vast power of modifying his environment, necessitates a fuller knowledge of that environment than can be required of the biologist in the narrower sense. Investigations along these lines would, I think, promote greatly the interests of geography as a whole, both by making clear to the general public its value and in justifying that intensive study of the surface relief and the associated phenomena which must always remain its basis.

# MEETING OF THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, HULL, September 6th to 13th, 1922.

(Report of the Delegate, T. W. Sowerbutts.)

The visit of the Association to Hull was marked by a liberal display of hospitality, both publicly and by private citizens towards the large gathering of members.

The Handbook to Hull, so ably edited by our old friend Mr. T. Sheppard, M.Sc., F.G.S., is not only full of interest but is a valuable record of the history and activities of Hull and East Yorkshire generally, and will well repay a careful perusal.

At the Inaugural Meeting in the City Hall, on the Wednesday evening, the President, Sir Charles Sherrington, delivered a much appreciated address on " Some Aspects of Animal Mechanism."

On Thursday evening the Lord Mayor received the guests in the City Hall, and in the same place on Thursday evening Professor Garstang delivered a particularly appropriate address on " Fishing : Old Ways and New."

Dr. F. W. Aston's address on the following Tuesday evening, on the " Size and Construction of Atoms " was thoroughly enjoyed, his witty and telling illustrations making up an evening's entertainment in which there was not a dull moment.

A number of the members had the privilege of being the guests of the Rotary Club, at their Friday Lunch, when Professor Osborne, of Melbourne, gave in little over half an hour a most complete and enlightening account of the development of Australia.

The proceedings of Section E (Geography) commenced with a characteristic paper by Miss Semple on " The Influence of Geographic Conditions upon Ancient Mediterranean Agriculture," which was followed later by Dr. Newbigin's

Presidential Address on "Human Geography," which by her kind permission will be found on page 175.

Papers on maps and surveying were given by Dr. Ashby (Malta), Mr. Frazer (Spitzbergen), Mr. Debenham (Polar Regions), Mr. Ogilvie (Latin America), Miss Wilcox, and there was on exhibition a collection of maps of Hull and the Humber estuary, assembled by Mr. Sheppard.

Professor Roxby was eloquent, as usual, on "Peking: its place in the Life of Modern China," and Dr. Vaughan Cornish gave a thoughtful paper on "The Isothermal Frontier of Ancient Cities."

The Sectional Committee recommended the re-appointment of the Joint Committee on the teaching of Geography.

The Conference of Delegates met on Thursday and Tuesday afternoons, when consideration was given as to what measures could be adopted to increase the interest of Corresponding Societies in the work of the Association.

# Reviews.

"The Physiography of the McMurdo Sound and Granite Harbour Region (British Antarctic (Terra Nova) Expedition, 1910—1913)." GRIFFITH TAYLOR, D.Sc., B.E. (Syd.), B.A. (Camb.), F.R.G.S. London, 1922.

The McMurdo Sound region is associated in a very special manner with British Antarctic exploration. The voyage of Ross in 1843, although no landing was made, indicated the importance and interest of this area, and it was natural that the first great scientific expedition to winter in the Antarctic, that under Scott in the *Discovery*, should make its quarters here. Since then Shackleton's *Nimrod* expedition and Scott's *Terra Nova* expedition have wintered in McMurdo Sound, and we now have a detailed knowledge of this small corner of the Antarctic Continent which contrasts strangely with our entire ignorance of even the position of the coast-line of the greater part of it.

In the present memoir, which forms one of the series of scientific reports of Scott's last expedition (1910-13), Dr. Griffith Taylor, the Senior Geologist of the expedition, gives an account of the physiography of the coastal regions of the Sound, and of the glaciers flowing down from the great Royal Society Range along about seventy miles of the South Victoria Land coast. The memoir is divided into two parts. The first contains a description of the various coastal features, sea-ice, bergs, islands, capes, piedmont glaciers and glacier tongues. The second is devoted to an account of the glaciers and nunataks of the hinterland, and ends with a discussion of glacier erosion.

This section is in some ways the most interesting of all. There is no doubt that the glaciation of this region is receding. Observations of the rock surfaces show that the glaciers were certainly a thousand feet or more thicker than they are at present at no very remote epoch, geologically speaking. Dr. Taylor concludes that the glaciers of South Victoria Land are doing very little erosion under present circumstances, although great erosion has taken place under more favourable, probably under warmer, conditions. Glacial erosion becomes less and less as the temperature diminishes below a certain optimum value, probably about 30° F. To quote Dr. Taylor:—"It seems probable that long ages have elapsed since it was warm enough for glacier ice to be mobile and for the hill slopes to be broken down by 'thaw and freeze' to supply the graving tools for the ice," and both these conditions seem to be necessary for glacier erosion. Nevertheless the effects of running water as an agent of erosion, even here, where the average temperature for the warmer months of the year is only 22° F., are far from negligible. This is due mainly to the absorption of the sun's rays by the dark rocks, helped by the circumstance that the sun is above the horizon continuously during the summer months.

Dr. Taylor lays great stress on the importance of cirque erosion, both present and past, in moulding the topography of the region, and agrees with the views of Johnson, Matthes, and Hobbs concerning the function of alternate thawing and freezing in cirque formation. He considers that, in an early stage of the cycle of glaciation in Antarctica, much cirque erosion and headward cutting by glaciers took place. This was followed by an advance of glaciation, culminating in an " ice-flood " period, when the thickness of the ice-sheet was at its maximum. The great outlet glaciers overwhelmed the cirques, without, however, obliterating them, and all the lowlands, with the exception of a few nunataks were covered with ice. At the present time the glaciation is receding, many of the cirques cut in the earlier period are reappearing, and we have a topography in which the older cirques show up on a surface subsequently affected by glacial erosion. To this compound topography Dr. Taylor has given the name " palimpsest."

The memoir should be of great interest to geographers and to all students of the Antarctic regions. It is profusely illustrated with photographs to which full reference is given in the text, and the description of the photographs is such that it is generally possible to identify both from the point of view and the features portrayed on one of the excellent maps which accompany the volume; thus anyone unacquainted with the region is able to get a very good idea of its general topography. In addition to the photographs there are many diagrams and generalized drawings of the various physiographical features which materially aid one's understanding of the problems discussed.

" The Glaciology of Antarctica." By C. S. WRIGHT and R. E. PRIESTLEY. British (Terra Nova) Antarctica Expedition, 1910—1913.

The expeditions of Captain Scott will have left a valuable bequest to posterity in their scientific memoirs. The Terra Nova series, to which this volume belongs, marks a decided advance upon the Discovery memoirs, excellent as they were, and forms the most fitting memorial to the immortal memory of our great explorer.

The book with which we are at present concerned has been eagerly anticipated by all who are interested in the subject, and they will be hard to please who are disappointed with the achievement of the authors. Two members of the scientific staff of the expedition, Mr. C. S. Wright, the physicist, and Mr. R. E. Priestley, geologist, have collaborated in producing this volume.* Such a partnership adds considerably to the value of the work, for no branch of science can be adequately treated as a watertight compartment, and glaciology, itself an important branch of physics, is intimately related to meteorology, as well as to physiography and geology. Mr. Wright has dealt with the physical, and Mr. Priestley with the geological, aspect of the subject; and both have devoted their attention to the influence of meteorology on glacierisation. The writers had excellent opportunities of observation, and collected an immense amount of data, which they have worked up with conspicuous ability into a monumental text-book.

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* Mr. Priestley had previously been Geologist to Shackleton's first Expedition.

This work is the last authoritative word on glaciology up to the present. It is also a comprehensive treatise on glaciology in general, with special reference to that of Antarctica, which is the most heavily glacierised land, and the only continent at present in its ice-age, in the world. Mr. Wright has dealt in a scholarly manner with ice physics, and Mr. Priestley is to be congratulated upon his attempt to settle the complicated classification of ice-formations. We believe him to have succeeded, in a work that was urgently needed, having based his system on a comprehension of all the essential factors. It would be too much to assume that finality has been reached, for very large portions of Antarctica still remain unexplored, and much more information is required concerning many of the ice-formations already known; but this is the first treatise on glaciology in which the glacial phenomena of Antarctica have received due attention, and the subject was necessarily imperfect until this was done.

This is not the occasion on which to discuss the details of the work before us. Neither of the authors had the advantage of visiting those Antarctic lands where the precipitation is heaviest, and where the continental ice-sheet slopes broadcast into the sea. We still await the scientific memoirs of Sir Douglas Mawson's expedition, which should throw much additional light on Antarctic glaciology. Further, this work would have been even more valuable than it is had the expedition been based upon a new district, instead of upon one which had been previously twice examined by scientists. Some of the data may be a trifle insecure, from having been built upon the observations of no more than one season which may be an abnormal one.

Still, it is hardly going too far to affirm that Messrs. Wright and Priestley have produced the only recent authoritative work on the glaciology of Antarctica, and it will be some years before it is likely to be superseded. The book is illustrated by a good series of photographs and sketches, and its maps are the best we have yet seen of this region.

J. G. H.

# Proceedings of the Society.*

1921.

The 1,146th Meeting of the Society was held on Tuesday, January 4th, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

The death of Mr. E. Roose Evans was noted with regret.

Mr. Chaudery Lall Khan lectured on "Ancient and Modern Persia."

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The 1,147th Meeting of the Society was held on Tuesday, January 11th, 1921. Mr. J. E. Balmer, F.R.G.S., being in the chair.

The election of the following members was announced :—*Ordinary*, Rev. M. O'Hara, Messrs. Hugh H. Bowden, Eric Whiteside. *Associate*, Miss Nora M. Wyatt. *Students*, Misses Agnes Lilian Wyatt and Marjorie Whiteside.

Mr. E. C. Burgis, M.A., LL.B., B.C.L., lectured on "A Soldier in Mesopotamia."

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The 1,148th Meeting of the Society was held on Tuesday, January 18th, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

The death of Mr. Charles Garnett was noted with regret.

The Rev. B. Dennis Jones, O.B.E., M.A., F.R.G.S., lectured on "The Beginning and End of the Turkish Campaign in the Great War. Gallipoli, 1915—Palestine, 1919."

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The 1,149th Meeting of the Society was held on Friday, January 21st, 1921, at 3.30 p.m., the President, Mr. E. W. Mellor, F.R.G.S., F.R.P.S., being in the chair.

Mr. J. J. Phelps, M.A., lectured on "The Romance of an old Canal : the influence of artificial Waterways on Commerce."

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The 1,150th Meeting of the Society was held on Tuesday, January 25th, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

Mr. J. R. Morland lectured on "Cuba."

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The 1,151st Meeting of the Society was held on Tuesday, February 1st, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

The election of the following members was announced :—*Ordinary*, Messrs. Thomas William Bates, Thomas Bayley, Randal Pearson, W. Egerton Smith, Miss Maud Talbot, Mrs. Florence Yeoman. *Associate*,

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* All the meetings were held in the Geographical Hall at 7.30 p.m. unless otherwise stated.

Miss Pauline Gannon, Mr. Arthur Templar. *Student,* Mr. Arthur F. Greenwood.

Mr. John Ainsworth, C.M.G., C.B.E., D.S.O., F.R.G.S., lectured on "British East Africa: Past and Present."

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The 1,152nd Meeting of the Society was held on Tuesday, February 8th, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

Mr. Samuel Wells, F.R.G.S., F.R.A.I., lectured on "The Ruined Cities of Mauretania and Numidia."

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The 1,153rd Meeting of the Society was held on Tuesday, February 15th, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

The election of the following members was announced:—*Ordinary,* Miss Harriett Broadhurst, Messrs. G. B. Doherty, Harold Mitchell Panting, C. L. Simmons. *Student,* Mr. William Edwards Wilding.

Dr. Albert Wilmore, D.Sc., F.G.S., lectured on "Some Contrasts in British Geography."

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The 1,154th Meeting of the Society was held on Friday, February 18th, 1921, at 3.30 p.m. Colonel Hy. T. Crook, V.D., D.L., presided.

The President, Mr. E. W. Mellor, F.R.G.S., F.R.P.S., lectured on "Some Dravidian Landmarks of Southern India."

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The 1,155th Meeting of the Society was held on Tuesday, February 22nd, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

Mrs. H. L. Lees, F.R.G.S., A.R.C.I., lectured on "Wanderings through Southern and Northern Rhodesia."

In consequence of the exceptional demand for tickets Mrs. Lees kindly repeated this address on Friday, February 25th, 1921.

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The 1,156th Meeting of the Society was held on Tuesday, March 1st, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

The election of the following members was announced:—*Ordinary,* Mr. S. B. Boyd, Mrs. Emma Hyde, Mr. Leslie T. Johnson. *Associate,* Miss Edith E. Granville Smith.

Mr. P. S. Sargent, F.R.G.S., lectured on "Egypt: Past and Present."

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The 1,157th Meeting of the Society was held on Tuesday, March 8th, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

Mr. Hugh H. Bowden lectured on "Czecho-Slovakia." (See p. 26.)

The 1,158th Meeting of the Society was held on Tuesday, March 15th, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

The death of Mr. S. Hinrichsen was noted with regret.

Mr. Ewin Pickstone lectured on " 'Mid Foss and Fjord."

The 1,159th Meeting of the Society was held on Friday, March 18th, 1921, at 3.30 p.m., the President, Mr. E. W. Mellor, F.R.G.S., F.R.P.S., being in the chair.

The Hon. G. W. Chester (Vice-Consul for Brazil) lectured on " Brazil."

The 1,160th Meeting of the Society was held on Tuesday, March 22nd, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

Mr. Harold Feber, B.Sc., M.I.H., F.R.H.S., lectured on " Three Thousand Miles up the Amazon, from the Atlantic to the Pacific."

## ANNUAL MEETING, 1921.

The Thirty-sixth Annual Meeting of the Society was held on Friday, May 27th, at 3.0 p.m., in the Lord Mayor's Parlour, Manchester Town Hall, by kind permission of the Lord Mayor (Alderman William Kay, J.P.), who presided.

Among those present were:—Miss B. Ashton, Messrs. J. E. Balmer, F.R.G.S., W. Burton, Graham Clarke, Colonel Hy. T. Crook, V.D., D.L., Messrs Battersby and Chapman (Eccles Co-operative Society), Councillor W. Gilchrist, Messrs. G. Ginger, Hallam, J. Howard Hall, Miss Law, Messrs. E. W. Mellor, F.R.G.S., F.R.P.S., President, J. R. Morland, Rev. J. G. Maude, M.A., Messrs. R. W. Nuttall, F. B. Osborne, M.A., T. W. F. Parkinson, M.Sc., M.Ed., F.G.S., Ald. J. R. Ragdale, Messrs. J. Stephenson Reid, H. Staniforth, Mrs. Stordy, Mr. E. Swithenbank, J.P., Miss Tinker, Mrs. Tweedale, Mrs. Walkden, Mrs. Wilkinson and the Secretary.

In opening the meeting the Lord Mayor said: I am most happy to preside over this meeting, and must apologise for my few minutes lateness in arriving. This particular Friday is a busy one, and it is difficult to fit in, in the twenty-four hours, every call upon the Lord Mayor.

The Secretary, having read the notice of the meeting, said: The minutes of the last annual meeting will appear in the ordinary course in the "Journal," and it is our usual custom to take them as read.

The meeting agreed to this, and the Secretary then read letters of apology for absence.

The Lord Mayor called upon the Secretary to read the Annual Report and Accounts.

The Secretary thereupon presented the report of the Council for the year ended December 31st, 1920, together with the accounts, as follows :—

## REPORT OF THE COUNCIL

### For the Year Ended December 31st, 1920.

The Council have the pleasure to submit their report on the proceedings of the Society during the year.

The Meetings have been attended by an increasing number of Members and friends, to such an extent that on several occasions, the capacity of the room has been fully tested. The Lectures delivered have, as usual, covered a wide range of interesting subjects, as will be seen from the list below :—

"The Geography of Britain at the time of the arrival of Man." Hon. Prof. Sir W. Boyd Dawkins, D.Sc., F.R.S.
"Historic Scenery of England." Mr. Percival J. Ashton.
"A Pilgrimage to famous English Places." Rev. J. H. Burkitt.
"The British Coasts: their variety and charm." Dr. Albert Wilmore, F.G.S.
"The Firth of Clyde, and the Royal Route to the Highlands." Mr. C. Owen Hockin.
"Manchester to Fort William and Back by Road. (A Scotch Motor Tour.)" Mr. Charles Sutton, F.A.I.
"The Roman Wall." Mr. J. Ernest Phythian, M.A.
"The Selborne Country and Gilbert White." Mr. Wilfred Mark Webb, F.L.S., F.R.M.S.
"The Fascination of Ireland." Miss L. Edna Walter, M.B.E., H.M.I.
"In North Western Donegal." Rev. A. W. Fox, M.A.
"Paris." Mr. J. G. Birkby, M.A.
"The Land of Pardons: Brittany and the Bretons." Rev. Alexander Taylor, M.A.
"The Battlefields of France and Belgium, seen after the War." Dr. A. C. Magian, F.R.G.S.
"A Post-War Visit to Belgium." Mr. Charles Sutton, F.A.I.
"The Ruin and Restoration of Belgium." Sir Cecil Hertslet, K.B.E.
"Glimpses of South Norway.' Miss Cecilia Marsh.

"Florence the Beautiful: Its History, Scenery, Art Treasures, and the Tragedy of the Early Renaissance." Mr. Thomas E. Green, F.R.G.S.

"South East Tibet and Western Yunnan." Capt. F. Kingdon Ward, B.A., F.R.G.S.

"Life in China as I saw it." "Bertha Glazier" (Mrs. Frost).

"Down the Nile to Jerusalem." Rev. B. Dennis Jones, M.A., O.B.E., Precentor and Minor Canon, Manchester Cathedral.

"The Future of East Africa and Uganda." Rev. A. B. Fisher, C.F., F.R.G.S.

"Some Patrol Work in the German East Africa." Mr. S. Pearson Jacoby, M.C., Croix de Guerre.

"South American Lands: a New World for Trade Conquest." Rev. James Johnston, F.R.Hist.Soc.

"The Danish Colonies in Greenland." Dr. James Brierley, M.A. (Oxon.), M.D., F.R.G.S.

"Round the World, by Ceylon, Burma and Japan." Sir John S. Randles, M.P.

"The Magic Carpet, or Peeps into some Foreign and Home-Lands." Mr. Henry Crowther, F.R.M.S.

"Fallacies and Fact concerning Chinese Jade." Mr. John Hilditch, F.R.G.S.

"Glaciers and Ice Sheets." Mr. Alan G. Ogilvie, O.B.E., M.A., B.Sc., F.R.G.S.

"The Influences of Geographical Environment." Capt. G. R. Swaine, F.R.Met.S.

The address by Mrs. Frost was illustrated by about 200 of her water colour drawings depicting scenes in China, the exhibition of which was continued for a week, addresses being given daily by Mrs. Frost or one of our Victorian members, and was attended by over 2,000 pupils from various local schools and colleges and other visitors.

The Journal for 1919 (Volume XXXV) was again issued in one number, in the month of May.

The additions to the Library and Map Collection include many items of special interest. The thanks of the Council were accorded to Sir William Mather for his gift of Baddeley's great work on Russia, Mongolia and Manchuria, and special mention should be made of the valuable and interesting series of Handbooks presented by the Naval Intelligence Division, through H.M. Stationery Office.

The thanks of the Council are tendered to the Victorians for their valued services during the year, in the delivery of Lectures, often at considerable inconvenience, and for their assistance in many ways.

The Council deeply regret the loss by death of the following members:—

The Rt. Hon. Lord Egerton of Tatton.
*The Rt. Hon. Sir William Mather, P.C., LL.D.
Mr. Marcus S. Bles, J.P.
Mr. James Brown, J.P.
Colonel W. W. Clapham.
Mrs. Heighway Dykes.
Mr. Marcus Morreau.
Mr. Emil Ost.
*Mr. C. E. Reade.
Rev. F. C. Smith, M.A., F.R.G.S.
Mr. Walter Speakman.
Mr. John Walker.
*Mr. Hermann Woolley.

* Original Members.

The Society cannot but suffer from the loss of these members, more especially such as Sir William Mather, Mr. C. E. Reade, Rev. F. C. Smith, and Mr. Hermann Woolley, who have all rendered valuable services for many years.

Through the kindness of Miss A. E. Law, the Council have been enabled to send to the Serbian University at Belgrade, a complete set of the Transactions of the Society, as a contribution towards the reconstruction of their Library.

The Accounts for the year 1920 with the Certificate of the Honorary Auditor are appended. The Revenue Account shows a further deficit for the year of £158. 9s. 9d., after taking credit for the Special Donations amounting to £124. 1s. 6d. While thanking the donors, the Council would point out that the accumulated repairs and the decorations of the principal rooms, absorbed a greater sum than was anticipated. It will be remembered that at the last Annual Meeting a revised scale of Subscriptions was adopted, which came into force on January 1st, 1921. The members generally have realised the necessity for the steps taken and the result is that for the current year the number of members is practically the same as for the year under review.

An appeal was made for donations to a fund in memory of the late Secretary, Harry Sowerbutts, the response to which has been such as to warrant the anticipation that a considerable portion of the cost of the education of his son will thereby be provided for.

# BALANCE SHEET, DECEMBER 31st, 1920.

| LIABILITIES. | | £ s. d. |
|---|---|---|
| To Sundry Creditors ... ... ... ... ... ... ... | | 242 8 10 |
| „ Subscriptions Paid in Advance :— | | |
| Ordinary ... ... ... ... ... ... | £80 11 0 | |
| Associates ... ... ... ... ... | 8 15 6 | |
| Students ... ... ... ... ... ... | 5 5 0 | |
| | | 94 11 6 |
| „ Life Membership Reserve Account ... ... ... ... | | 256 10 0 |
| „ Kirkpatrick Endowment Fund ... ... ... ... ... | | 50 0 0 |
| „ Eli and Emma Sowerbutts Memorial Fund ... ... ... | | 150 0 0 |
| „ Harry Sowerbutts Memorial Fund : Donations as per list ... | | 174 9 2 |
| „ John Walkden Memorial Fund : Balance unexpended .. | | 4 17 3 |
| „ Investment Depreciation Account ... ... ... ... | | 451 11 4 |
| „ Bank Balance overdrawn ... ... ... ... ... . | | 20 14 6 |
| „ Balance :— | | |
| Brought from last Account ... ... ... | £220 0 2 | |
| Less Net Deficiency, 1920 ... ... ... | 158 9 9 | |
| | | 61 10 5 |
| | | £1,506 13 0 |

| ASSETS | | £ s. d. |
|---|---|---|
| By 172 Shares, £10 each fully paid, in the M.G.S.B. Coy., Ltd. | | |
| 62 Purchased ... ... ... ... ... | £211 11 4 | |
| 110 Presented ... ... ... ... ... | 1,100 0 0 | |
| | | 1,311 11 4 |
| „ Subscriptions in Arrear :— | | |
| Ordinary ... ... .. ... ... ... | £10 10 0 | |
| Associate ... ... ... ... ... ... | 0 10 6 | |
| | | 11 0 6 |
| „ Account Owing ... ... ... ... ... ... ... | | 0 15 0 |
| „ Cash at Bank : Harry Sowerbutts Memorial Fund ... ... | | 174 9 2 |
| „ Cash in Hand ... ... ... ... ... ... ... | | 8 17 0 |
| | | £1,506 13 0 |

## AUDITOR'S CERTIFICATE.

I have audited the above Balance Sheet, and certify same to be correct I have examined and found to be in order the Shares in the Manchester Geographical Society Building Company, Limited.

JOHN THOMASON,
*Hon. Auditor.*

Manchester,
29th April, 1921.

# REVENUE ACCOUNT.

*Dr.* YEAR ENDED DECEMBER 31st, 1920 *Cr.*

| 1920. | | £ s. d. | 1920. | | | £ s. d. |
|---|---|---|---|---|---|---|
| Decr. 31. | To Expenses of Meetings ... | 159 9 7 | Decr. 31. | By Members' Subscriptions :— | | |
| | „ Journal, Vol. XXXV, *less* receipts ... | 116 18 8 | | Ordinary ... | £449 8 0 | |
| | „ Rent, Lighting and Insurance ... | 93 11 4 | | Associate ... | 52 14 6 | |
| | „ Salary ... | 130 10 0 | | Societies ... | 10 10 0 | |
| | „ Wages ... | 131 18 9 | | | | 512 12 6 |
| | , Sundry Expenses ... | 70 17 2 | | „ Bank Interest ... | | 1 9 7 |
| | „ Expenses, etc.: New Members and Collection of Subscriptions ... | 5 15 7 | | „ Balance carried down ... | | 198 5 6 |
| | , Books, Maps, etc., Library ... | 3 6 6 | | | | |
| | | £712 7 7 | | | | £712 7 7 |
| Decr. 31. | To Balance brought down ... | 198 5 6 | Decr. 31. | By Donations as per list ... | | 124 1 6 |
| | „ Special Expenditure: Decoration and Repairs ... | 84 5 9 | | „ Balance deficit net ... | | 158 9 9 |
| | | £282 11 3 | | | | £282 11 3 |

NOTE.—The Furniture, Fittings, Books, Maps, Lantern, Slides, and Stock of Journals which are insured for £2,000, are not included as Assets in the Balance Sheet. There are 50 Life Members (including two Honorary), and the Subscriptions of 27 of this number have been taken as income in the years prior to 1908.

## DEFICIENCIES FOR YEARS 1919 AND 1920.

### DONATIONS RECEIVED DURING 1920.

| | £ | s. | d. |
|---|---|---|---|
| Ainsworth, John, C.M.G., C.B.E., D.S.O. | 1 | 0 | 0 |
| Alexander, W. T., J.P. | 1 | 1 | 0 |
| Anon. (J. R.) | 0 | 10 | 6 |
| Armitage, J. Faulkner, J.P. | 2 | 2 | 0 |
| Ball, F. W. | 0 | 10 | 0 |
| Balmforth, A. | 1 | 1 | 0 |
| Bardsley, Elisha, J.P. | 0 | 10 | 6 |
| Beech, Misses | 0 | 15 | 0 |
| Bellamy, C. H., F.R.G.S., F.R.Hist.S. | 2 | 2 | 0 |
| Berry, G. F. | 0 | 10 | 0 |
| Bishop, J. K. | 1 | 1 | 0 |
| Boddington, Hy., J.P. | 5 | 0 | 0 |
| Bolivar, Mrs. A. de | 0 | 10 | 6 |
| Booth, A. H. | 0 | 10 | 0 |
| Brooks, S. H., F.R.G.S. | 5 | 0 | 0 |
| Brown, A. | 0 | 10 | 0 |
| Buckley, Jas. | 0 | 10 | 6 |
| Burgon, A. | 2 | 2 | 0 |
| Burke, Thos. | 0 | 5 | 0 |
| Burton, Walter | 0 | 10 | 0 |
| Campbell, B | 0 | 10 | 0 |
| Carver, W. O. | 2 | 2 | 0 |
| Cater, Miss J. | 0 | 10 | 0 |
| Charnock, Mrs. E. | 0 | 5 | 0 |
| Clapham, Thos., F.R.G.S. | 0 | 10 | 0 |
| Cocker, T. A. | 0 | 10 | 6 |
| Cooke, J. Herbert | 1 | 1 | 0 |
| Coppock, Miss A. | 0 | 10 | 6 |
| Crewdson, Alfred | 5 | 0 | 0 |
| Crook, Col. H. T., D.L., V.D. | 0 | 10 | 6 |
| Duckworth, C. | 2 | 2 | 0 |
| Dyckhoff, C. | 2 | 0 | 0 |
| Evans, L. C. | 1 | 1 | 0 |
| Forsyth, Hy. | 1 | 0 | 0 |
| Ginger, George | 1 | 1 | 0 |
| Glossop, J. P. B. | 1 | 1 | 0 |
| Godlee, Francis | 2 | 2 | 0 |
| Goodwin, J. W. | 0 | 2 | 6 |
| Goss, Adam B. | 1 | 0 | 0 |
| Graham, Miss J. | 0 | 5 | 0 |
| Grant, Miss F. S., M.A., B.Sc. | 0 | 10 | 0 |
| Green, H., M.A. | 1 | 0 | 0 |
| Groves, W. G., J.P. | 2 | 2 | 0 |
| Guest, Miss M. J. | 0 | 5 | 0 |
| Hailwood, Ald. A., J.P. | 0 | 10 | 0 |
| Hancock, J. | 0 | 10 | 0 |
| Hayes, Miss M. | 0 | 5 | 0 |
| Heys, John | 1 | 0 | 0 |
| Hindle, J., L.R.A.M. | 1 | 1 | 0 |
| Hilton, Mr. and Mrs. T. | 1 | 0 | 0 |
| Horsfall, T. C. | 1 | 1 | 0 |
| Houghton, John | 3 | 0 | 0 |
| Hutton, J. Arthur | 5 | 0 | 0 |
| Kay, Richard, F.R.G.S. | 5 | 5 | 0 |
| Kelly, H. F. | 0 | 10 | 0 |
| Keltie, Sir J. Scott, LL.D., F.R.G.S. | 1 | 1 | 0 |
| Lambert, Mrs. R. J. | 0 | 5 | 0 |
| Lees, Walter | 1 | 1 | 0 |
| Lemon, Miss J. | 0 | 10 | 0 |
| Lewis, B. | 1 | 0 | 0 |
| Little, D. A. | 1 | 0 | 0 |
| McPherson, A. | 1 | 0 | 0 |
| Martin, R. | 0 | 5 | 0 |
| Marx, Chas. | 2 | 2 | 0 |
| Mather, Capt. L. E., F.R.G.S. | 2 | 2 | 0 |
| Medlyn, W. J. | 0 | 10 | 0 |
| Mellor, E. W., J.P., F.R.P.S., F.R.G.S. | 2 | 2 | 0 |
| Nanson, Miss W. M. | 0 | 10 | 0 |
| Neild, Jesse | 0 | 10 | 0 |
| Nichol, Wm. | 1 | 1 | 0 |
| Nuttall, Harry, J.P., F.R.G.S. | 2 | 2 | 0 |
| Nuttall, Mr. and Mrs. R. W. | 1 | 0 | 0 |
| Openshaw, Miss E. N. | 0 | 5 | 0 |
| Parkinson, T. W. F., M.Sc., F.G.S. | 0 | 10 | 0 |
| Phythian, J. E., M.A. | 0 | 10 | 6 |
| Pickstone, Ewin | 1 | 1 | 0 |
| Potts, Mrs. H. A. | 0 | 5 | 0 |
| Randles, Sir John S., M.P. | 1 | 1 | 0 |
| Richardson, Miss M. | 0 | 10 | 0 |
| Robertshaw, J. | 0 | 10 | 0 |
| Scott, Walter | 0 | 10 | 0 |
| Shaw, A. E. | 0 | 10 | 6 |
| Smith, Sidney | 0 | 10 | 0 |
| Smith, T. M. | 1 | 1 | 0 |

| | £ | s. | d. |
|---|---|---|---|
| Spencer, W. | 5 | 0 | 0 |
| Staniforth, Harry | 0 | 5 | 0 |
| Stordy, Mrs. | 0 | 10 | 0 |
| Swaine, Captain G. R., F.R.Met.S. | 0 | 10 | 0 |
| Taylor, Miss A. I. | 0 | 5 | 0 |
| Taylor, Miss Elsie | 0 | 2 | 6 |
| Taylor, Walter | 0 | 10 | 0 |
| Thomas, G., J.P. | 2 | 2 | 0 |
| Thorpe, Walter | 1 | 1 | 0 |
| Tinker, Miss | 1 | 1 | 0 |
| Ward, W. H. (In Memory of Harry Sowerbutts) | 1 | 0 | 0 |
| Waterhouse, Gilbert, M.A., F.R.G.S. | 1 | 0 | 0 |
| Watson, Joseph | 1 | 1 | 0 |
| Welsh, W. | 5 | 5 | 0 |
| Whitby, W. H. | 2 | 0 | 0 |
| Whittle, H. B. | 1 | 1 | 0 |
| Wilkinson, Miss | 0 | 10 | 0 |
| Wilkinson, W. | 1 | 1 | 0 |
| Willert, A. | 1 | 0 | 0 |
| Woolfenden, J. | 0 | 10 | 0 |
| Wood, Miss E. | 0 | 2 | 6 |
| Woodhouse, J. H., F.R.I.B.A. | 0 | 10 | 6 |
| Young, Leonard | 0 | 5 | 0 |
| | £124 | 1 | 6 |

## HARRY SOWERBUTTS MEMORIAL FUND.

Donations Received during 1920.

| | £ | s. | d. |
|---|---|---|---|
| Ainsworth, John, C.M.G., C.B.E., D.S.O. | 1 | 0 | 0 |
| Alexander, W. T., J.P. | 1 | 1 | 0 |
| Anon. (J. R.) | 0 | 10 | 6 |
| Balmforth, A. | 1 | 1 | 0 |
| Bardsley, Elisha, J.P. | 0 | 10 | 6 |
| Barningham, Mrs. | 2 | 2 | 0 |
| Beech, Misses | 1 | 1 | 0 |
| Bellamy, C. H., F.R.G.S., F.R.Hist.S. | 2 | 2 | 0 |
| Berry, G. F. | 1 | 0 | 0 |
| Bickerton, R. | 1 | 0 | 0 |
| Bishop, J. K. | 1 | 1 | 0 |
| Boddington, Hy., J.P. | 5 | 0 | 0 |
| Bolivar, Mrs. A. de | 1 | 1 | 0 |
| Booth, A. H. | 0 | 10 | 0 |
| Brown, Alfred, | 0 | 10 | 0 |
| Bubb, Mrs. A. | 0 | 10 | 0 |
| Buckley, Jas. | 0 | 10 | 6 |
| Buckley, W. S. | 1 | 1 | 0 |
| Burgon, A. | 4 | 4 | 0 |
| Burke, Thos. | 0 | 5 | 0 |
| Burton, Walter | 0 | 10 | 0 |
| Carver, W. O. | 1 | 1 | 0 |
| Charnock, Mrs. E. | 0 | 5 | 0 |
| Clarke, C. A. | 1 | 1 | 0 |
| Cocker, T. A. | 0 | 10 | 6 |
| Cooke, J. Herbert | 1 | 1 | 0 |
| Coppock, Miss A. | 0 | 10 | 6 |
| Crewdson, Alfred | 5 | 0 | 0 |
| Crook, Col. H. T., D.L., V.D. | 1 | 1 | 0 |
| Dyckhoff, C. | 5 | 0 | 0 |
| Edwards, T. A., F.R.G.S. | 2 | 2 | 0 |
| Fairhurst, T. | 0 | 10 | 0 |
| Forsyth, Hy. | 1 | 0 | 0 |
| Gamble, Lieut.-Col. M., R.A.M.C., M.D. | 1 | 1 | 0 |
| Ginger, George | 5 | 0 | 0 |
| Glossop, J. P. B. | 1 | 1 | 0 |
| Godlee, Francis | 2 | 2 | 0 |
| Goodwin, J. W. | 0 | 2 | 6 |
| Goss, Adam B. | 1 | 0 | 0 |
| Graham, Miss J. | 0 | 5 | 0 |
| Guest, Miss M. J. | 0 | 5 | 0 |
| Hailwood, Ald. A., J.P. | 0 | 10 | 0 |
| Hall, J. Howard | 1 | 0 | 0 |
| Hayes, Miss M. | 0 | 5 | 0 |
| Heys, John | 1 | 0 | 0 |
| Hilton, Mr. and Mrs. T. | 0 | 10 | 6 |
| Hindle, J., L.R.A.M. | 1 | 1 | 0 |
| Hockin, C. Owen | 0 | 10 | 0 |
| Hodgson, Wm. | 1 | 1 | 0 |
| Horsfall, T. C. | 1 | 1 | 0 |
| Houghton, John | 5 | 0 | 0 |

| | £ | s. | d. |
|---|---|---|---|
| Hulme, C. J. | 1 | 1 | 0 |
| Kay, Richard, F.R.G.S. | 5 | 5 | 0 |
| Lambert, Mrs. R. J. | 0 | 5 | 0 |
| Lancaster, Miss | 5 | 0 | 0 |
| Lancaster, James, J.P. | 5 | 5 | 0 |
| Lawson, R. G. | 1 | 1 | 0 |
| Lees, Walter | 2 | 2 | 0 |
| Lemon, Miss A. | 0 | 10 | 0 |
| Little, D. A. | 2 | 2 | 0 |
| Martin, R. | 0 | 5 | 0 |
| Medlyn, W. J. | 0 | 10 | 0 |
| Mellor, E. W., J.P., F.R.P.S., F.R.G.S. | 10 | 10 | 0 |
| Mort, Miss | 0 | 10 | 0 |
| Neild, Jesse | 0 | 10 | 0 |
| Nichol, Thomas | 1 | 1 | 0 |
| Nichol, Wm. | 2 | 2 | 0 |
| Nuttall, Harry, J.P., F.R.G.S. | 10 | 10 | 0 |
| Nuttall, Mr. and Mrs. R. W. | 1 | 0 | 0 |
| Openshaw, Miss E. N. | 0 | 5 | 0 |
| Parkinson, T. W. F., M.Sc., F.G.S. | 0 | 10 | 0 |
| Phythian, J. E., M.A. | 1 | 1 | 0 |
| Pickstone, Ewin | 1 | 1 | 0 |
| Potts, Mrs. H. A. | 0 | 5 | 0 |
| Ragdale, Ald. J. R. | 5 | 0 | 0 |
| Reed, J. Stephenson | 1 | 1 | 0 |
| Richardson, Miss M. | 0 | 10 | 0 |
| Robertshaw, J. | 0 | 10 | 0 |
| Scott, Walter | 0 | 10 | 0 |
| Shaw, A. E. | 1 | 1 | 0 |
| Smith, Sidney | 0 | 10 | 0 |
| Smith, T. M. | 2 | 2 | 0 |
| Spencer, W. | 1 | 1 | 0 |
| Staniforth, Harry | 0 | 5 | 0 |
| Steinthal, Egbert | 2 | 0 | 0 |
| Stordy, Mrs. | 0 | 10 | 0 |
| Sutton, Charles | 1 | 1 | 0 |
| Swaine, Captain G. R., F.R.Met.S. | 0 | 10 | 0 |
| Taylor, Miss A. I. | 0 | 5 | 0 |
| Taylor, Miss Elsie | 0 | 2 | 6 |
| Taylor, Mrs. Lily | 1 | 1 | 0 |
| Taylor, Walter | 0 | 10 | 0 |
| Thomas, George, J.P. | 1 | 1 | 0 |
| Thomson, Wm., F.R.S.Ed. | 1 | 1 | 0 |
| Thorpe, Walter | 1 | 1 | 0 |
| Tinker, Miss | 1 | 1 | 0 |
| Walker, Miss M. G. | 0 | 10 | 0 |
| Walter, Miss L. Edna, H.M.I., O.B.E. | 0 | 10 | 6 |
| Waterhouse, Gilbert, M.A., F.R.G.S. | 1 | 0 | 0 |
| Watson, Joseph | 1 | 1 | 0 |
| Welsh, W. | 2 | 2 | 0 |
| Whittaker, J. H. | 0 | 10 | 0 |
| Whitby, W. H. | 5 | 0 | 0 |
| Whittle, H. B. | 1 | 1 | 0 |
| Willert, A. | 1 | 0 | 0 |
| Williamson, Miss E. S. R. | 0 | 10 | 6 |
| Wilkinson, Miss | 0 | 10 | 0 |
| Wilkinson, W. | 2 | 2 | 0 |
| Woolfenden, J. | 1 | 0 | 0 |
| Wood, Miss E. | 0 | 2 | 6 |
| Woodhouse, J. H., F.R.I.B.A. | 1 | 1 | 0 |
| Young, Leonard | 0 | 10 | 0 |
| Zimmern, Miss F. M., W. H. and Capt. Norman | 10 | 10 | 0 |
| | £174 | 9 | 2 |

The Lord Mayor: Now, ladies and gentlemen, the little duty I have to perform is to move that the report and accounts be approved and adopted. I have much pleasure in doing so. I cannot claim any great knowledge of the Society, or of the usefulness it fulfils, but there is one thing I should draw attention to—a difficulty that I think every society at the moment finds itself met with—that your accounts show a deficit of £158 9s. 9d. That is a complaint we all seem to suffer from, but I think it is a matter for congratulation that we can still find public-spirited men and women who are willing and always ready to come forward and further the interests of the Society as a whole. That that may continue for a long time is my sincere wish. In moving with pleasure the adoption of these accounts and the report I hope that you will have a successful future. I have pleasure in calling upon Colonel Crook to second the resolution.

Colonel Hy. T. Crook, V.D., D.L., : It is with great pleasure that I rise to second this motion for the adoption of the report for the year and also the financial statement. I think all the members of the Society are very well satisfied with the results of last year's operations. I do not remember in our history a more generally interesting and varied session than we had last year and the commencement of the present year. We had very interesting and valuable papers, and the public interest, and the interest of the members, in the work of the Society was shown to be great. The attendances at our meetings, I think, show that we are always now, my Lord Mayor, under pressure to find accommodation for those who desire to attend the Society's lectures. It is a desirable position to be in, though it sometimes inflicts inconvenience upon those who are late in arriving. But at the same time it establishes the success of the Society. In reading the report the Secretary alluded to one or two of the chief finances of the year. In connecton with that there was a special collection to meet the deficiency on the accounts, which, as the Lord Mayor has remarked, does not wipe out the adverse balance. But we had the consent of our members to increase the subscriptions, and the Council believe that with those increased subscriptions, and the sum which has been contributed, there is every prospect that in the coming year we shall be able to make ends meet. There has been a willing response to the increased subscription, and so far that increase has not brought about any reduction in the members of the Society. That is to say, that the decrease in numbers owing to the usual circumstances, death and resignations, has not been abnormal, and shows that the increase in the subscriptions has apparently had no effect upon the number of members, and the influx of new members is quite as good as it is has been in any of the past sessions. Then we had the special fund, which our members started themselves, in memory of the services of our late Secretary, Mr. Harry Sowerbutts. Those who had charge of that fund, as the report already states, have been able to make a certain advance towards the cost of the education of Mr. Harry's son. We hope that the investment in which part of this fund has been placed, with the result of any further help which may be obtained from other members of the Society, will be sufficient to ensure the proper education of his child. I am sure it will be satisfactory to every member of the Society that by this means we have been able to show how greatly we treasure the memory of Mr. Harry Sowerbutts, who did so great and gallant a work for the Society for such a long period of years, and so worthily followed in the footsteps of his father. I think the accounts are in every sense favourable, and that the increased subscription will enable us to make ends meet during the ensuing session. You can see that the accounts have been audited and have been presented in the usual form. Having made these few remarks upon our present position, I conclude by seconding the motion which the Lord Mayor has put before you, that the report and accounts be received and adopted.

The Lord Mayor then put the resolution to the meeting, and it was adopted unanimously.

The list of nominations was next presented by the Secretary.

He stated that Mr. Ogilvie, who was on last year's list, had taken up an important post in New York in connection with the American Geographical Society, and was confining his attention to research work there. Mr. MacFarlane had gone to Aberdeen. It was proposed to fill these vacancies by inserting the names of Mrs. H. L. Lees and Mr. Burgon, and, with these exceptions, the list was the same as last year.

Mr. J. R. Morland moved : "That the Officers and Council, as nominated, be and are hereby elected." " I also propose," said Mr. Morland, " include in the resolution thanks for the services already offered, and also our satisfaction at the way in which those members who have officiated and continue in office have done their work. I have confidence that the new members will also do good work."

Mr. E. Swithenbank seconded. In glancing down the names he saw, he said, that they were largely representative of the learning of Manchester and neighbourhood and of its commercial men. Especially it contained the names of many whom he might perhaps call old servants of the Society.

"I think," concluded Mr. Swithenbank, "the list is a very full one and a very satisfactory one."

The following were then unanimously elected as Officers and Council for 1921-1922:—

**Patron.**

HIS MAJESTY THE KING.

**President.** Mr. E. W. MELLOR, J.P., F.R.G.S., F.R.P.S.

**Past-President.** Mr. HARRY NUTTALL, J.P., F.R.G.S.

**Vice-Presidents.**

The Right Hon. the EARL OF DERBY, K.G., G.C.V.O.
The Rt. Rev. the BISHOP OF SALFORD.
Sir HENRY A. MIERS, D.Sc., F.R.S., Vice-Chancellor of the University.
The Right Hon. the LORD MAYOR OF MANCHESTER.
His Worship the MAYOR OF SALFORD.
Sir E. TOOTAL BROADHURST, Bart., D.L., J.P.
Sir C. W. MACARA, Bart., J.P.
Sir JOHN S. RANDLES, M.P.
Sir H. F. DE TRAFFORD, Bart.
Captain W. C. BACON, J.P., Chairman Ship Canal Company,
Mr. J. E. BALMER, F.R.G.S.
Colonel HY. T. CROOK, V.D., D.L.
Hon. Prof. Sir W. BOYD DAWKINS, J.P., F.R.S.
Mr. HENRY FILDES, M.P.
Colonel E. W. GREG, J.P., C.B., F.R.G.S.
Mr. THEODORE GREGORY, F.C.A., J.P.
Mr. J. S. HIGHAM, J.P.
Mr. EDWARD HOPKINSON, M.P., D.Sc.
Mr. T. O. JACOBSEN, J.P., L.C.C., F.R.G.S.
Colonel JOSEPH NALL, D.S.O., M.P.
Mr. GEORGE THOMAS, J.P.

**Trustees.**

Mr. HARRY NUTTALL, J.P., F.R.G.S.
Mr. SIDNEY L. KEYMER, F.R.G.S.
Mr. E. W. MELLOR, J.P., F.R.G.S., F.R.P.S.

**Hon. Treasurer.** Mr. DAVID A. LITTLE.

**Hon. Editor.** Mr. EGBERT STEINTHAL.

**Hon. Secretaries.**

Mr. RICHARD KAY, F.R.G.S.
Mr. T. W. F. PARKINSON, M.Sc., M.Ed., F.G.S.

**Hon. Secretary (Victorians).** Mr. C. A. CLARKE.

**Council.**

Mr. JOHN AINSWORTH, C.M.G., C.B.E., D.S.O., F.R.G.S.
Mr. ANTHONY BURGON.
Miss S. A. BURSTALL, M.A.
Mr. C. A. CLARKE.
Mr. C. COLLMANN.
Mr. T. A. EDWARDS, F.R.G.S.
Mr. GEORGE GINGER.
Mr. J. HOWARD HALL.
Mrs. H. L. LEES, F.R.G.S., A.R.C.I.
Mr. H. C. MARTIN, F.R.G.S.
Captain L. E. MATHER, F.R.G.S.
Rev. J. G. MAUDE, M.A.
Mr. F. B. OSBORNE, M.A.
Mr. EWIN PICKSTONE.
Miss KATE QUALTROUGH, F.R.G.S.
Mr. J. R. RAGDALE, C.A., J.P.
Mr. ALFRED REE, Ph.D.
Mr. J. STEPHENSON REID,
Mr. J. WALTER ROBSON, J.P.
Mr. R. A. STANIFORTH.
Miss L. EDNA WALTER, M.B.E., B.Sc., H.M.I.

Mr. E. W. Mellor, the President of the Society, before giving his annual address, observed :—This is an auspicious day on which to hold our annual meeting, because I learn from our Secretary that—if he had been alive still—to-day would have been the birthday of the first Secretary of the Society, the late Mr. Eli Sowerbutts. If he is absent, I am quite sure his spirit is with us, and is shown in his son. When I had the pleasure of last addressing you in this hall, I drew attention to air routes across the Continent of Africa at some length. Since then an expedition has been made by air all the way to Australia by Sir Ross Smith and his brother, Sir Keith Smith. I am not going to enlarge upon that now, because they are lecturing in London at the present time on the work they did, and there is no doubt, I think, that in the process of time they will come to Manchester, and you will have an opportunity of hearing them. But when they do come I should like you to note the clever way in which they performed their journey, keeping as much as possible over land in case of accident.

Proceeding, Mr. Mellor said :—Four hundred years ago last month, April, there died one of the world's great explorers and map-makers, Ferdinand Magellan. Magellan was familiar with the East Indies, and the voyage thither round the Cape of Good Hope, and he conceived the idea of the possibility of a western passage to the Indies, or Spice Islands, as they were known in those days. Spanish explorers had already convinced themselves that there was way to the Pacific Ocean through the Isthmus of Central America. As you know, it was reserved for the people of nearly 400 years later to construct the Panama Canal.

Magellan proposed to the Spanish Court that he should search for a Western passage to the Spice Islands, arguing that as Africa, Arabia, India and the Malay Peninsula all tapered southward to a point, beyond which was a navigable sea, South America might be expected to do the same.

Magellan set out on his voyage, and after much toil and hardship, his enterprise was rewarded by the discovery of the Strait which bears his name, the Strait which divides Terra del Fuego from Patagonia, the Strait of Magellan, through which Ferdinand Magellan made his Western passage to the Orient.

Some little time later Magellan came to an untimely end in the Phillipines. His quatercentenary is being celebrated in Chili, Spain, and in Portugal, for by birth Magellan was a Portuguese.

Now, let us come down to the present day.

Since we met in this Hall a year ago one of the most remarkable and most courageous achievements in geographical exploration has taken place, and the credit of it belongs to a lady, Mrs. Rosita Forbes, who planned, and successfully carried out, an expedition into the Unknown, to places where no white woman ever trod before, places so jealously guarded that no white person might ever be expected to return—indeed, only one European, a man named Rohls, has ever attempted it before, and that was 42 years ago. He, however, was forced to return by the way he went with his task only partially accomplished.

What, then, was the object which Mrs. Rosita Forbes has so splendidly accomplished, and which has yielded valuable information? Nothing less than to cross the Libyan desert, whose great rolling sand dunes, hundred of miles in length, give that part of the Sahara the aspect of a vast shifting sea of sand, and to visit the Oases of Kufra, in the heart of the desert and the headquarters of the dread Senussi.

In order to appreciate the achievement, let us realise what the Senussi are, and then let us think of Mrs. Forbes' difficulties.

The founder of the Senussi order, Seyyid Mahommed ben Senussi, born in the beginning of the 19th century, traced his descent from Fatima, the daughter of the Prophet. He settled in an oasis in the very heart of the Sahara, and there built up the fraternity which bears his name. They devote themselves to the strictest rules of the Mahommedan faith, and are ceaselessly at work teaching and converting. The Senussi Order is divided into "Zawias," or Lodges, all under the Grand Lodge, headed by the Master, El Senussi. They are gradually covering Africa and the Moslem world with their lodges and zawais, converting and disciplining the natives to the faith of Islam. So great is the awe inspired by the Senussi throughout North Africa that an order from them is promptly obeyed. The Kufra Oases away deep in the Sahara are the stronghold of the Senussi—a mysterious spot, surrounded by absolute desert, with wells many miles apart, and the routes of approach known only to experienced Senussi guides, each one of whom would die a thousand deaths rather than divulge them. Such, then, is the place which Mrs. Forbes set out to visit.

Now, let us glance at her experiences. She left England on the first of November last, and went to Benghazi in Tripoli. There happened to be at the same time at this place Benghazi, the head of the Senussi Order, Sidi Idrisse en Senussi, completing the ratification of a treaty with the Italians. His good graces were enlisted to the extent that he gave Mrs. Forbes a letter of permission or introduction, without which it is doubtful whether she would have returned alive, and even with it she had some narrow escapes.

From Benghazi Mrs. Forbes made her way southward on horseback, 80 miles to Jedabia, where the desert begins. This was on the 28th of last November, four weeks from England.

Thanks to the Emir's letter, Mrs. Forbes was furnished with servants and horses, but a section of the more fanatical brethren were opposed to her further journey. A plot by one of the brethren to rob and murder her after she should have started was discovered, upon which the head man of Jedabia gave her the use of his own camels and soldier slaves.

While her caravan was being prepared the discovery of further plots against her life caused Mrs. Forbes to make a sudden midnight flight. At one o'clock on a dark, cold, windy night she and the black slaves cleverly evaded the spies who surrounded them, and managed to make their way out of the town. Mrs. Forbes was in Bedouin disguise, *i.e.,* she wore white and green trousers, and a straight crimson cloak. Her face was veiled, and a black kerchief was wound round her head and neck. She had also a long scarlet sash, beneath which were hidden a couple of revolvers and a compass, and on her feet she wore yellow heel-less slippers.

She and her attendants now travelled south by slow and weary stages, and were reduced almost to starvation.

No stranger can go south of Jedabia without the written permission of the head of the Senussi. His influence is enormous, and he is regarded as the supreme spiritual and temporal authority. Thus Mrs. Forbes' letter was of extreme value, but during this time she found it necessary to pass as a Moslem of half-English, half-Egyptian blood, and this required her to pray five times daily in the Moslem fashion and to repeat, whenever necessary, the Moslem formulæ. One day a black soldier threatened to shoot her as a Christian, but the caravan people were convinced that she was a Moslem.

The Emir's letter stood her in good stead when they reached the village of Jalo, where she and her following were left undisturbed and at peace. At this point she has accomplished 200 miles of her adventurous journey.

And now for a fortnight the little party were absolutely alone in the desert—they saw neither caravan nor human being of any sort. A sandstorm stopped their watches, and they had to live by Arab time, the day commencing an hour after sunset. Quarrels between the black slaves and the Arabs of the party became one of her worst difficulties, and she and her leaders had to keep their revolvers ready in case of emergency. The quarrels were induced by the hardships and privations to which they were reduced. And this is how they spent last Christmas and New Year's day.

They found some wells at Battifal, whence it was a seven days' journey to the next well. They had to carry all the water they used, *viz.*, one quart daily per person.

The next oasis proved to be erroneously charted, and the eighth day found them still marching, all their drinking water gone and themselves reduced to the juice of tinned vegetables. They had to endure their thirst still another day—the ninth—when an uncharted well was discovered.

Two more days brought them to Buzeima, their exhausted camels dropping by the way. The inhabitants of this village were at first hostile, but later Mrs. Forbes was allowed to explore a little. She found in this oasis two Zawia villages, and ruins of forts built by the Tebu, the Berber aborigines. The huts, or houses, are also used as graves, the dead being buried in a sitting position and rolled in sheepskins.

Another four days journeying brought the party to the edge of the Kufra Oasis, in which is the sacred city of the Senussi. On their way they passed a group of human skeletons, evidently a party who had died of thirst.

At Hawari, the first village of the Kufra Oasis, the fanatical Zawias believed that Mrs. Forbes was planning to seize the country by the aid of magical instruments, for so they regarded her compass, field-glasses and aneroid barometer. A crowd of men, shouting furiously, surrounded the party. All but two of the black slaves ran away, and Mrs. Forbes and her depleted party were imprisoned in their tents. On learning that she was, so to speak, the guest of the Senussi chief, the head man of the village allowed her to proceed.

Mrs. Forbes entered Taj on foot, as no one is allowed to ride in this holy city of the Senussi. She has now reached her destination, after covering some 550 miles from Benghazi on the coast.

Mrs. Forbes describes Taj as a strange little city of windowless houses, built like fortresses, with solid walls of black stone with red sand for mortar. Taj contains a zawia or convent, a mosque and large houses for a few important brethren. Nobody is seen outside the lofty walls of the houses, and it thus appears like a deserted city. The wells at Taj are a hundred feet deep, and water is precious. Everything needed is brought up by slaves from the valley below the city.

The Senussi employ a large amount of slave labour. In the neighbouring town of Jof there is a regular market for slaves, in which a man fetches the equivalent of about £20, and a woman £30. Quite a large proportion of these slaves are Sudanese. The whole population of the Kufra Oasis, which includes the towns of Taj and Jof, is about 3,000 Zawia Arabs, about 300 Tebu, the more aboriginal people and a large number of slaves.

For nine days Mrs. Forbes lived in Taj the life of a veiled Arab woman, visiting the holy spots and performing the rites of worship prescribed by the Senussi Zawias. It became expedient for her to hurry her departure from Taj. She, however, determined to open out a new route to the north, believing that it would give an impetus to trade with Egypt; so she sent home the soldier slaves and other people who had hitherto accompanied her.

On January 25th last Mrs. Forbes started on the new venture with five men and nine camels. They bore in a northerly and slightly north-westerly direction, and in four days reached an uncharted well. This they had to re-dig, as it was filled up with sand, nobody having been there for four years.

They now had a march of twelve days through absolute desert, an uncharted route, without a single well—a desert never traversed by a European, and very rarely attempted even by Arabs.

They walked thirteen hours daily, making a daily average of 30 miles; they had no tent and had to sleep in flea-bags. They had to carry twelve skins of water, dates for the camels and fuel.

Sixteen days after leaving the sacred city of Taj they reached the valley in which stands the great white zawia or convent of Jarabub, containing the tomb of Seyyid Mohammed ben Senussi, the founder of the Senussi order. In her quality as a Moslem Mrs. Forbes made a pilgrimage to the tomb.

On February 13th last she and her little party started again eastwards for Siwa. The camels were almost exhausted, so the progress was slow; then one of her principal men fell and broke his collar-bone. Mrs. Forbes set it as well as she was able, and though he was in great pain the man had the pluck to ride on for 30 miles.

Late in the second night Mrs. Forbes and her party met a Camel Corps Patrol of the Egyptian Frontier Administration, which had been sent out to look for them. The Patrol brought spare camels, stores and water. Mrs. Forbes had an enthusiastic welcome from the officers at Siwa.

Her trials were now over, for next day Government motor cars carried her across the Libyan plateau, 430 miles, to Alexandria in Egypt.

Mrs. Forbes' expedition contributes much geographical knowledge, of which I may quote the following summaries as epitomised in the "Times":—

1. The principal oasis of the Kufra group, named "Kebabo" on existing maps, but whose proper name is "Kufira," is found to lie considerably to the south-east of the position it has hitherto been believed to occupy.

2. The oasis of Ribiana, which existing maps call Erbhena, lies nearly south, instead of south-west of Buseima, and is situated considerably further east than was hitherto believed. Buseima, you will remember, is a place where the natives at first received Mrs. Forbes in a hostile manner.

3. A number of hitherto unknown wells have been located. These extend in a belt nearly across the direct line between Buseima and Jalo, and have been found to contain a good water supply.

4. The practicability of a direct rout from Kufra to Jarabub has been demonstrated, thus proving a new way into Egypt from the west.

The desert has been crossed by two caravan routes from time immemorial, the one from Darfur in the northern Sudan, to Assiut on the Nile. This route is known as the " Arbain " or " Forty Days' Track." The other caravan route is from Wadai, which lies between Darfur and Lake Chad, across the heart of the desert, through Kufra, and on to the Mediterranean coast of Tripoli.

These two great caravan routes have been traversed for countless generations, but it has remained for Mrs. Forbes to work out and carry through, with enormous pluck and endurance, a route from the Kurfra Oases of the Sahara, by Siwa, to Lower Egypt.

To Mrs. Rosita Forbes, then, belongs the credit of amending and adding to this part of the map of Africa ; and I think that I am justified in acclaiming her as the 1920-1921 heroine of African exploration. She has had the honour of a Royal command to relate her adventures to His Majesty the King, and she has lectured, in London, to the Royal Georgraphical Society on her expedition.

Before resuming my seat I should like to call your attention to a remarkable book, " The Rising Tide of Colour," by an American writer, one Lothrop Stoddard, in which he deals with the aftermath of the recent great war, and its effect upon the geographical distribution of the human family. He points out that of the whole land surface of our world the white races —Europeans and Americans—possess and govern nine-tenths, and that only one-tenth is possessed and governed by the coloured peoples—yellow, brown, black and red. The proportions of population are very different. The white races number only about three-tenths of the whole world population, whereas the coloured races number about seven-tenths—more than double the white races. Roughly then, the white three-tenths govern nine-tenths, and the coloured seven-tenths govern only one-tenth of the world. This, on the face of it, seems rather paradoxical.

The author calls attention to the danger of reckoning the advance and development of nations merely by political government or possession, and insists that the real ultimate factor is racial expansion and predominance. He shows that the coloured races are to-day seven-tenths of the whole world population ; of these, the yellow are the most numerous, viz., 500 millions. The brown races are nearly as numerous, 450 millons, and more widely spread. The black, or negroid, races are only about a third of these figures, viz., 150 millions.

At the present time there is no doubt that the coloured races are propagating much faster than the white. The whites are the slowest breeders, and, apparently, the tendency is to become still slower, as so many sections of the white race are revealing in the lowered birth-rate which became so marked a feature in France. None of the coloured races show a similar tendency; on the contrary, they seem to breed in an increasing degree. Heretofore the increase of coloured population has been kept in check by famine, disease and tribal warfare. Nowadays, the greater part of the coloured world is under white control, and wherever the white man goes he puts down tribal war, he fights against epidemic disease, and achieves an almost prevention of famine. The result is a portentious increase of coloured population. Even ancient autonomous countries like China and Japan are adopting the white man's methods, and are experiencing the same accelerated increase of population.

The author then asks what it is that is indicated by these remarkable facts? And he answers the question thus: They point only to one thing, viz., a steadily augmenting thrust of surplus coloured people from their overcrowded coloured homelands. Where can they go? Ninety per cent. of the world is governed by white people. Yes, but the coloured people require more space for racial expansion, with the consequence that a feeling of antipathy is growing in their breasts against the dominant white man. For example, a Japanese scholar, Professor Ryutaro Nagai, writes: "The world was not made for the white man, but for the other races as well."

For the last 400 years the white man, equipped with resistless sea-power, and with superior arms, added one tract of land after another to his empire, and though the white conqueror was never loved by the conquered coloured peoples, he was respected and feared by them.

Then in 1904 came the Russo-Japanese War, in which the white man was worsted by the yellow man, the Japanese. This event gave a thrilling shock to all the coloured world, and white supremacy was no longer acquiesced in. Yellow men and brown men now considered themselves the equals of white men.

Ten years later, in 1914, came the recent great war, and what a spectacle presented itself. The coloured world beheld the white world tearing itself to pieces, locked in an internecine death-grapple of unparalleled ferocity, and, says our author, Chinese scholars, Japanese Professors, Hindu pundits, indeed every portion of the coloured world, all voiced drastic criticisms of white civilisation.

The white world to-day lies debilitated, weak and wounded sore, presenting to the coloured world conditions which are an incitement to rash dreams and violent action, and we ourselves to-day see the East in acute ferment.

The ethnic focus of the yellow world has always been China, and four-fifths of the yellow race are concentrated in China; the other fifth comprises Japan, Korea and Indo-China. Lothrop Stoddard estimates that the population of China increases at the rate of six millions annually, and that of Japan at the rate of 800,000. Both these countries increasingly feel the pressure of race expansion.

The natural flow for excess Chinese population would seem to be to the peninsulas and archipelagoes lying between China and Australia, but they are all under white control, viz., Britain, France, Holland and the United States. We must remember, too, that the Chinaman has a wonderful knack of adapting himself to varying climatic conditions; he can live on very little, and he can work and thrive under conditions which would kill a less hardy race.

The Japanese is not quite so robust, he has not the same power of adapting himself to the extremes of climatic conditions as the Chinaman has. The Japanese cannot live so far into the cold north, nor so far into the tropics. His natural expansion, then, would seem to be towards the United States, the temperate parts of South America and Australia. There, again, the yellow man is up against white control.

Now, if you will picture to yourselves the broad belt of land from the Pacific Ocean, across Southern Asia, and Northern Africa, to the Atlantic, you will find it to be the homeland of the brown races, chiefly composed of Indians and Arabs. The brown races nearly equal the yellow races in point of numbers, but there is this essential difference: The yellow world is a fairly compact geographical block in the Far East, whereas the brown world spreads half-way round the globe.

The religious faiths of the brown world are chiefly

Hinduism, Buddhim, and Mohammedanism, the latter being a very large proportion, and this constitutes an undoubted source of danger, for recent years have seen, and the present time is seeing, a wonderful revival of Islam.

Every Mohammedan is practically a missionary for Islam, which now wields an enormous power; indeed, its proselytising power over the negro peoples of Central Africa is something extraordinary. We have already noted the extraordinary influence, control and discipline exercised by the Senussi over the Islamic world.

The outward thrust of increasing brown population would seem to be towards those parts of Africa which are the cradle of negro peoples, and where the white man has planted his colonies and civilisation. Thus our author seems to scent in the far distance the sympton of collision between the brown man and the white, another possible crusade, the Crescent against the Cross.

Now, what of the black races, the negroes? In numbers they are about a quarter of either the brown races or the yellow races. Fundamentally, the black man differs widely from either the brown man or the yellow man.. Both the brown and the yellow races can refer back to their own ancient history, and they have each contributed to the civilisation of the world. But not so the black man. He has contributed nothing to civilisation, but has remained a savage; his numbers have been kept down by heathen rites, unstudied disease and tribal warfare. Having no history and no natural high standard of life, he shows a willingness to accept foreign tutelage wholly absent in the Asiatic. Thus the white man has colonised in Africa on a scale which he could not in the Far East. But, says Stoddard, the yellow and the brown man may want to share those colonies.

Under the protecting care of the white man the negro, who is the quickest breeder of the human race, has increased largely in numbers. That this protection should be preserved is the paramount duty of the white man. That the more or less plastic character of the black man should be yielded up to the cold inscrutability of the yellow man or to the fiery superstition of the Islamic brown man would be a profound misfortune, not only for Africa herself but for the whole civilised world. The white man must thereore stand fast in Africa at all costs.

There may be some degree of exaggeration in the picture which Lothrop Stoddard has drawn in his book, but at all events the facts which he marshals affords much food for reflection and serious thought. In view of the constant and gradual spreading of the tentacles of the coloured world, like those of some colossal octopus, there is no room for such white race suicide as that brought about on a large scale by the recent great war; there is no room for white race deterioration such as that brought about by the privations caused to mothers and children by internal discord, such as the recent coal strike; and every effort should be made to recruit the white race by A.1 children brought up in the healthy influence of A.1 environment.

On the proposition of Mr. J. E. Balmer, F.R.G.S., seconded by the Rev. J. G. Maude, M.A., it was resolved: "That the best thanks of the Society be tendered to Mr. John Thomason, A.C.A., for his services as auditor, and that he be re-elected for the forthcoming year."

Mr. F. B. Osborne, M.A., then moved: That the thanks of the meeting be tendered to the Lord Mayor for the use of his parlour and for presiding over the meeting. "We frequently have the honour," said Mr. Osborne, "of having Lord Mayors to preside over our annual meetings, but so far as my recollection goes we do not frequently have these Lord Mayors stay until the end of the meeting. It has been a pleasure to us, my Lord Mayor, to see you there the whole time, and I think I can say, also, that it has been a pleasure to you to come to this oasis in our industrial strife, and to hear Mr. Mellor give his most admirable address." Mr. Osborne expressed regret that the Lord Mayor was not wearing the Order of the Rising Sun, presented to him by the Crown Prince of Japan. When Sir John Randles lectured to them on Japan he passed round the beautiful decoration the Mikado had presented to him. From what Sir John Randles said, Japan was a land they all ought to go to.

In seconding the resolution, Mr. J. R. Ragdale, C.A., J.P., said they knew from past experience how energetic the Lord Mayor had been for the good of the citizens of Manchester. "We also feel," he added, "that it must be a great strain upon your time, and therefore we appreciate all the more the fact that you have come this afternoon, no doubt at inconvenience to yourself, to preside over our meeting."

The resolution being carried unanimously, the Lord Mayor said he had made up his mind to tender his thanks to Mr. Mellor for a very interesting address. "I think it runs in the blood of every Englishman with imagination to be interested in stories of exploration and adventure, and, above everything else, I think it is most interesting to think there are still, in this go-ahead century, places not yet visited by white people. Anything that will take one's mind away from the present industrial strife and one thing or another is, indeed pleasant." Referring to his Japanese decoration, the Lord Mayor observed: "I feel most that it is a compliment to Manchester. I do not know that I have done anything to deserve it except to supervise the arrangements for the visit, to see that the city behaved itself, and a desire to further the interests of trade and commerce. I have been pleased to spare the time to be with you. It has been a pleasure and a privilege." He added that the Town Hall should be given at all times to all worthy objects.

At the conclusion of his remarks the Lord Mayor handed round his Japanese decoration, which was greatly admired.

The 1,161st Meeting of the Society was held on Tuesday, October 4th, 1921. Colonel Hy. T. Crook V.D., D.L., presided.

The deaths of the Rev. Wm. Nicholls and Mr. Thomas Barningham were noted with regret.

The election of the following members was announced:—*Ordinary*, Mrs. K. M. Allen, Messrs. James Atkinson, Wm. P. Bridge, Denis J. Chapman, Leo Crosland, Wm. Garside, Joseph Hackney, Miss Dora Halstead, Mrs. Daisy Hamnet, Miss Myfanwy Jones, Miss Doris Mudie, Mr. C. D. Silas. *Associate*, Mrs. Darricotte, Mrs. Florence Jones, and Miss Edith Wilkinson.

Arising out of the Report of the Delegate to the British Association Meeting at Edinburgh, the following resolution was proposed by the Chairman and carried unanimously:—

> "This meeting of the Manchester Geographical Society views with alarm the very inadequate and decreasing provision for Geographical instruction in the University of Manchester, which is the more remarkable when contrasted with the advances made in other Educational centres, many of less importance commercially, feeling that Manchester should stand in the front rank as a centre of Geographical education and research, resolves to support the Council in any measures they may take to arouse public interest

in an effort to remove what is a reproach to a civilised and progressive community."

The Rev. Alexander Taylor, M.A., lectured on "The Romance of Corsia."

The 1,162nd Meeting of the Society was held on Tuesday, October 11th, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

Mr. Frederico Duarte lectured on "A Trip to Portugal by Sea."

The 1,163rd Meeting of the Society was held on Friday, October 14th, 1921, at 3.30 p.m. Colonel Hy. T. Crook, V.D., D.L., presided.

In consequence of the sudden illness of Dr. Julio Garcia Salas, who was to have spoken on "Central America," the President, Mr. E. W. Mellor, F.R.G.S., F.R.P.S. (at only a few moments' notice), gave an address on "Reminiscences of India and Ceylon."

The 1,164th Meeting of the Society was held on Tuesday, October 18th, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

The death of Mr. Alfred Crewdson (one of the original members of the Society) was noted with regret.

The election of the following members was announced :—*Ordinary*, Mrs. Ida A. Bullough, Mrs. A. C. Burrows, Hon. George Wm. Chester, Mr. T. W. Gaskin, Miss Annie Gregson, B.Sc., Rev. James Gordon Hayes, M.A., Mr. M. G. Hering, Mrs. Helena Senior, Miss Tatham, Mrs. Harriett Whiteside, Miss Florence E. Willson. *Associate*, Miss J. Daniel, Miss E. Denham, Miss Sarah Ellwood, Mr. J. H. Todd, Mrs. Todd, Mr. B. R. Tydeman, and Miss Minnie Whyte.

Miss E. G. Kemp, F.R.S.G.S., lectured on "Wanderings in Western China." Many of the slides were reproductions of Miss Kemp's own watercolour drawings.

The 1,165th Meeting of the Society was held on Tuesday, October 25th, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

Dr. Albert Wilmore, D.Sc., F.G.S., lectured on "A Geographer among British Mountains."

The 1,166th Meeting of the Society was held on Tuesday, November 1st, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

The death of Mr. R. P. Hewit (one of the original members of the Society) was noted with regret.

The election of the following members was announced :—*Ordinary*, Messrs. Wm. Crabb, Edwin Holt, Miss M. E. Jones, Mrs. F. W. Lamb. *Associate*, Miss Christine Lowe, and Miss Lucy Taylor.

Mr. Louis Golding, B.A., lectured on "Salonika."

The 1,167th Meeting of the Society was held on Tuesday, November 8th, 1921. Colonel John Ainsworth, C.M.G., C.B.E., D.S.O., F.R.G.S., presided.

In consequence of the illness of Mr. W. Leonard Flinn, who was to have lectured on "Through Persia in 1921," Colonel Hy. T. Crook, V.D., D.L., addressed the members on "The Dunsterforce in Persia."

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The 1,168th Meeting of the Society was held on Tuesday, November 15th, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

Rev. A. B. Fisher, C.F., F.R.G.S., lectured on "Central African Lakes and the Nile."

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The 1,169th Meeting of the Society was held on Tuesday, November 22nd, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

Professor B. J. Wilden Hart, M.A., F.R.Hist.S., F.R.G.S., lectured on Poland.

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The 1,170th Meeting of the Society was held on Tuesday, November 29th, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

The deaths of Messrs. J. J. Cardwell (one of the original members of the Society), J. E. P. Scott and Henry Terry were noted with regret.

The election of the following members was announced :—*Ordinary*, Miss Annie Bell, Mrs. Budge, Mr. G. B. Grocott, Miss Ellen Hibbert, Messrs. Douglas J. J. Owen, E. G. Radford, A. W. Shaw, George Taylor. *Associate*, Mrs. Edith Brindle, Miss E. E. Smith, and Miss Edith Wallace.

Captain G. M. Bles (Consul for the Netherlands) lectured on "A Winter Visit to India, Burma and Ceylon."

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The 1,171st Meeting of the Society was held on Tuesday, December 6th, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

The deaths of Mr. Wm. Proctor and Mr. H. H. Bowden were noted with regret.

The Very Rev. J. Gough McCormick, D.D. (Dean of Manchester), lectured on "Some Aspects of Native Life in South Africa."

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The 1,177th Meeting of the Society was held on Friday, December 9th, 1921, at 3.30 p.m., the President, Mr. E. W. Mellor, F.R.G.S., F.R.P.S., being in the chair.

Colonel John Ainsworth, C.M.G., C.B.E., D.S.O., F.R.G.S., lectured on the "Commercial Possibilities of Kenya Colony." (See page 51.)

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The 1,178th Meeting of the Society was held on Tuesday, December 13th, 1921. Colonel Hy. T. Crook, V.D., D.L., presided.

Miss Doris Mudie lectured on "Thoughts of a Common Censor in Czecho-Slovakia."

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The Annual Children's Meeting was held on Tuesday, December 20th, 1921, at 6.0 p.m. Mr. George Ginger presided.

Miss Edith Lang addressed the children on "A Talk about Egypt and Greece."

1922.

The 1,179th Meeting of the Society was held on Tuesday, January 10th, 1922. Colonel Hy. T. Crook, V.D., D.L., presided

The election of the following members was announced :—*Ordinary*, Miss Ogden and Mr. Frank Short.

Mr. J. E. Phythian, M.A., lectured on "Among the Swiss Alps." The address was illustrated by slides made from photographs taken by the late Mr. Hermann Woolley.

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The 1,180th Meeting of the Society was held on Friday, January 13th, 1922, at 3.30 p.m., the President, Mr. E. W. Mellor, F.R.G.S., F.R.P.S., being in the chair.

Sir Alfred Sharpe, K.C.M.G., C.B., lectured on "Belgium in Africa."

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The 1,181st Meeting of the Society was held on Tuesday, January 17th, 1922. Colonel Hy. T. Crook, V.D., D.L., presided.

The death of Dr. Edward Hopkinson, M.P., was noted with regret.

The Rev. Walter Weston, M.A., lectured on "The Geography of Japan, with special reference to its influence on the Character of the Japanese people."

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The 1,182nd Meeting of the Society was held on Tuesday, January 24th, 1922. Colonel Hy. T. Crook, V.D., D.L., presided.

The Rev. Arthur W. Fox, M.A., lectured on "Where Three Counties Meet : Devon, Somerset and Dorset."

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The 1,183rd Meeting of the Society was held on Tuesday, January 31st, 1922. Colonel Hy. T. Crook, V.D., D.L., who presided, referred to the tragic death of Sir Ernest Shackleton, C.V.O., F.R.G.S.

Before we enter upon the programme of to-night's meeting it will doubtless conform to the feelings of all present that some reference be made to the sad news which yesterday was brought to us from the Southern Seas. By the death of Sir Ernest Shackleton not only Britain but the World is poorer, that is shown by the tributes which are coming in from all parts of the earth. As a French journalist puts it : "There is no better way of celebrating his memory than by recounting the great achievements with which his too short life was filled." With those achievements we of this Society are familiar. Many of us have had the privilege of hearing an account of them from his own lips, and we looked forward to the time when we should again listen to him giving the tale of his latest quest ; but alas ! that is not to be, for the quest has ended for him at the very gates of the region he had set out to explore.

Shackleton was of that type of men whom no danger can daunt nor sufferings deter from the enterprise in hand whether the undertaking be voluntary or imposed. A type in which Britain has seldom been lacking and to which we owe "all that we have and are." That fine courage, the capacity for organization and administration, that sympathy and understanding of men, that sense of honour and high principle, the possessing in full that spirit which has animated our adventures by sea and land and carried the British flag to the four corners of the globe.

It is some consolation to know that Shackleton's last expedition is not to be abandoned, that his work will be carried on by his companions. Of its late leader we may say :—

" All things are in order left,
To port and hawser's tie no more returning.
Depart upon thy endless cruise, great Sailor! "

The election of the following members was announced :—*Ordinary*, Messrs. Harry Bradbury, Leonard E. Healey, Robert J. Kelly, Miss Agnes Lawson, Miss Mary Murray, Messrs. John Walter Price, F.R.G.S., James Wm. Walker, Mrs. S. G. Wyatt. *Associate*, Miss Churchman, Miss E. Langley Dickinson, Miss Edith Hardman, Miss Agnes McEwan, and Miss M. E. Morton.

Mr. James Shaw, F.R.P.S., lectured on " Burgos and a Bull Fight; or, Scenes in a Spanish City."

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The 1,184th Meeting of the Society was held on Friday, February 3rd, 1922, at 3.30 p.m. Colonel Hy. T. Crook, V.D., D.L., presided.

Mr. Henry Holden lectured on " The South Island of New Zealand."

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The 1,185th Meeting of the Society was held on Tuesday, February 7th, 1922. Colonel Hy. T. Crook, V.D., D.L., presided.

The deaths of Sir Edward Tootal Broadhurst and Mr. Charles F. Collman were noted with regret.

Mr. W. Leonard Flinn lectured on " Through Persia in 1921."

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The 1,186th Meeting of the Society was held on Tuesday, February 14th, 1922. Colonel Hy. T. Crook, V.D., D.L., presided.

The deaths of Messrs. W. H. Ormerod and John Stevenson were noted with regret.

Sirdar Ikbal Ali Shah, M.R.A.S., F.R.G.S., lectured on "Afghanistan."

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The 1,187th Meeting of the Society was held on Tuesday, February 21st, 1922. Colonel Hy. T. Crook, V.D., D.L., presided.

The death of Mr. Charles Duckworth was noted with regret.

Dr. R. N. Rudmose Brown lectured on " Spitzbergen of To-day."

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The 1,188th Meeting of the Society was held on Tuesday, February 28th, 1922. Colonel Hy. T. Crook, V.D., D.L., presided.

Mr. Oliver Brockbank, M.A., lectured on " Petra and Mount Hor."

The 1,189th Meeting of the Society was held on Tuesday, March 7th, 1922. Colonel Hy. T. Crook, V.D., D.L., presided.

The election of the following members was announced :—*Ordinary*, Messrs. Thomas Gibson Barnfather, Albert Battersby, Sister Julia Beyaert, Miss Lilian Davies, Miss Catharine Jones, Messrs. Robert H. Low, and Oliver Tilzey. *Associate*, Miss Ryder.

Mr. Ewin Pickstone lectured on "Carlisle to Carlisle, via John O'Groats."

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The 1,190th Meeting of the Society was held on Tuesday, March 14th, 1922. Colonel Hy. T. Crook, V.D., D.L., presided.

Mr. W. W. F. Pullen, H.M.I., lectured on "The Lure of the Hills."

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The 1,191st Meeting of the Society was held on Tuesday, March 21st, 1922. Colonel Hy. T. Crook, V.D., D.L., presided.

Miss Kate Qualtrough, F.R.G.S., lectured on "Atlantis and the Ancients." (See p. 77.)

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The 1,192nd Meeting of the Society was held on Tuesday, March 28th, 1922. Colonel Hy. T. Crook, V.D., D.L., presided.

Mr. T. A. Edwards, F.R.G.S., lectured on "South Africa Revisited."

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## ANNUAL MEETING, 1922

The Thirty-seventh Annual Meeting of the Society was held, by kind permission of the Lord Mayor of Manchester, in the Lord Mayor's Parlour at the Town Hall on Friday, May 26, 1922, at 3.0 p.m.

In the absence of the President, Mr. E. W. Mellor, F.R.G.S., F.R.P.S., Colonel Hy. T. Crook, V.D., D.L., took the chair, and there were present :—Colonel John Ainsworth, C.M.G., C.B.E., Messrs. Elisha Bardsley, J.P., E. Barlow, Deaconess Bromley, Mrs. Budge, Miss Budge, Mrs. Clarke, Messrs. Graham Clarke, T. A. Edwards, F.R.G.S., Colonel E. W. Greg, V.D., C.B., F.R.G.S., Theodore Gregory, J.P., J. Howard Hall, Rev. J. Gordon Hayes, M.A., Mrs. Hyde, Mrs. Welfitt Nicholls, Miss Welfitt Nicholls, Mr. F. B. Osborne, M.A., Mrs. Sowerbutts, Miss Sowerbutts, Mrs. Stordy, Mr. J. H. Walker, and the Secretary.

A letter was read from the Lord Mayor regretting his inability to be present, as he had promised, but he was prevented by a meeting on municipal business which he must attend. The Vice-Chancellor of the University, in apologising for non-attendance, explained that he had to be present at a meeting of University Convocation that afternoon. Mr. J. E. Balmer, F.R.G.S., the Vice-Chairman, and Mr. David A. Little, the Hon. Treasurer, also sent apologies for absence.

The minutes of the last meeting were taken as read.

The Secretary then presented the report and balance-sheet.

## REPORT OF THE COUNCIL.

### For the Year ended December 31st, 1921.

The Council have the pleasure to submit their report on the proceedings of the Society during the year.

The attendance of Members and friends at the weekly meetings has been well maintained, and the Lectures delivered have covered a wide range of interesting subjects, as will be seen from a perusal of the following list :—

"Some Contrasts in British Geography." Dr. Albert Wilmore, F.G.S.
"A Geographer among British Mountains." Dr. Albert Wilmore, F.G.S.
"Romance of an Old Canal : The Influence of Artificial Waterways on Commerce." Mr. J. J. Phelps, M.A.
"'Mid Foss and Fjord." Mr. Ewin Pickstone.
"A Trip to Portugal by Sea." Mr. Frederico Duarte.
"The Romance of Corsica." Rev. Alexander Taylor, M.A.
"Poland." Professor B. J. Wilden-Hart, M.A. (Oxon.), F.R.Hist., F.R.G.S.
"Czecho-Slovakia." Mr. Hugh H. Bowden.
"Thoughts of a Common Censor in Czecho-Slovakia." Miss Doris Mudie.
"Salonika." Mr. Louis Golding, B.A.
"A Talk about Egypt and Greece." Miss Edith Lang.
"Egypt : Past and Present." Mr. P. A. Sargant, F.R.G.S.
"The Ruined Cities of Mauretania and Numidia." Mr. S. Wells. F.R.G.S., F.R.A.L.
"Belgium in Africa. Sir Alfred Sharpe, K.C.M.G., C.B.
"Central African Lakes and the Nile." Rev. A. B. Fisher, C.F., F.R.G.S.
"British East Africa : Past and Present." Mr. John Ainsworth, C.M.G., C.B.E., D.S.O., F.R.G.S.
"Commercial Possibilities of Kenya Colony." Mr. J. Ainsworth, C.M.G., C.B.E., D.S.O., F.R.G.S.
"Wanderings through Southern and Northern Rhodesia." Mrs. H. L. Lees, F.R.G.S., A.R.C.I.
"Some Aspects of Native Life in South Africa." Very Rev. J. Gough McCormick, D.D. (Dean of Manchester).
"The Beginning and End of the Turkish Campaign in the Great War (Gallipoli 1915 and Palestine 1919)." Rev. B. Dennis Jones, O.B.E., M.A., F.R.G.S.
"A Soldier in Mesopotomia." Mr. E. C. Burgis, M.A., LL.B., Bc.L.
"A Winter Visit to India, Burma and Ceylon." Capt. G. M. Bles.
"Some Dravidian Landmarks in Southern India." Mr. E. W. Mellor, J.P., F.R.G.S., F.R.P.S.
"Wanderings in Western China." Miss E. G. Kemp, F.R.G.S.
"Cuba." Mr. J. R. Morland.
"Brazil." Hon. G. W. Chester (Consul for Brazil in Manchester).
"Three Thousand Miles up the Amazon : From the Atlantic to the Pacific." Mr. H. Feber, B.Sc., M.I.H., F.R.Hist.S.

The Journal for 1920 (Volume XXXVI) has been issued, but still in only one number, as, unfortunately, the finances of the Society prevent more frequent issues as your Council would desire.

The Library and Map Collection continue to grow, and the thanks of the Council have been accorded to Mr. Abel Heywood, J.P., and others for their valuable contributions.

The Collection of Lantern Slides, which now numbers over 12,000, has been enriched through the gift by Mr. Abel Heywood, J.P., of his collection of 550 slides, most of which are particularly welcome as they will fill gaps in the collection, the want of which has long been felt. These collections are being made use of by the members in a much greater degree year by year, but a further increase in the demand will be a source of gratification to the Council.

The Victorians have again rendered valuable service by the delivery of Lectures, the organisation of Social Gatherings and in other ways.

The Council deeply regret the loss of the following members by death during the year :—

Mr. Thomas Barningham, J.P.
„ Hugh H. Bowden.
* „ J. J. Cardwell.
* „ Alfred Crewdson.
„ E. Roose Evans.
„ Charles Garnett.
* „ R. P. Hewit, J.P.
„ S. Hinrichsen.
Rev. W. Nicholls.
Mr. Wm. Proctor.
„ J. E. P. Scott.
„ Henry Terry.

* Original Members.

Arising out of the Delegate's report on the meeting of the British Association your Council passed the following resolution :—

> " That this Society has heard with great interest and pleasure the suggestion of the President of the British Association for the Advancement of Science, that the time has now arrived when another National Expedition for

> Oceanographical exploration and research should be undertaken. In urging upon the Government the desirability of preparing and equipping such an Expedition, as soon as circumstances will permit, the Society wishes to emphasise the importance of the results that accrued from the voyage of H.M.S. 'Challenger' in 1872—1876, results invaluable both to pure Science and to its practical application in the national interest."

The further discussion on this report drew forcible attention to the position of Geographical Education, particularly at the Universities, with the result that the following resolution was submitted to the Members and approved by them on the 4th October, 1921:—

> "This meeting of the Manchester Geographical Society views with alarm the very inadequate and decreasing provision for Geographical instruction in the University of Manchester, which is the more remarkable when contrasted with the advances made in other Educational centres many of less importance commercially, feeling that Manchester should stand in the front rank as a centre of Geographical education and research, resolves to support the Council in any measures they may take to arouse public interest in an effort to remove what is a reproach to a civilised and progressive community."

Since the passing of this resolution your Council have had meetings, at which they have been greatly assisted by the advice and co-operation of the Vice-Chancellor of the University (Sir Henry A. Miers, D.Sc., F.R.S.), Prof. F. E. Weiss, D.Sc., F.R.S., and Dr. R. N. Rudmose Brown, and are glad to acknowledge the amount of good work which has been accomplished in spite of the lack of funds. They realise that the financial difficulty at the present time is particularly onerous, and trust that when the appropriate time comes, such appeal as may be made to enable this reproach to be removed will receive the cordial support, not only of the Members of this Society, but of the community generally.

The Council learn with great pleasure that Mr. W. H. Barker, who is Professor of Geography at Southampton, has been appointed to take charge of the Geographical Department at the Manchester University.

The Accounts for the year 1921, with the Certificate of the

Honorary Auditor, are appended. For the first time for some years the Revenue Account shows a small balance on the right side. This balance has been further augmented by the gifts and donations shown in detail, for which the thanks of the Council have been accorded. Special mention, however, should be made of the £200 in shares in the Building Company presented by Colonel E. W. Greg, C.B., V.D., F.R.G.S., which was originally in the form of Debentures handed to the Trustees on the condition that they should be transferred into share capital so as to bring nearer the time when dividends can be paid by the Company and so benefit the Society, which now holds nearly two-fifths of such capital. Another of our Life Members, who joined before the increased subscription came into force, has kindly paid an additional sum of £5 5s., which has been added to the Life Membership Fund.

The year 1921 is the first under the revised rates of Subscription, and it is encouraging to note that the Membership at the end of the year is 651, being a net increase of five members during the year.

In order more fully to develop the work of the Society, the Council would urge the necessity of a large increase in this number, and will be grateful for the further support and co-operation of the members in their efforts to realise this aspiration.

### HARRY SOWERBUTTS MEMORIAL FUND.

| | | | £ | s. | d. |
|---|---|---|---|---|---|
| Balance, December 31st, 1920 | | | 174 | 9 | 2 |
| Add Donations, 1921 :— | | | | | |
| Mr. A. W. Arning | £1 1 0 | | | | |
| ,, W. Elliot | 0 10 0 | | | | |
| ,, W. H. Ginn | 0 5 0 | | | | |
| ,, W. Harper | 1 1 0 | | | | |
| Miss E. M. Ireland | 0 10 0 | | | | |
| Mr. H. F. Kelly | 0 5 0 | | | | |
| Miss A. E Law | 1 1 0 | | | | |
| Mrs. H. L. Lees | 2 10 0 | | | | |
| Miss L. Oldfield | 0 10 0 | | | | |
| Miss K. Qualtrough | 1 0 0 | | | | |
| Mr. Hugh Stowell | 1 0 0 | | | | |
| Mr. A. W. Wood | 1 1 0 | | | | |
| | | | 10 | 14 | 0 |
| Add Interest | | | 8 | 7 | 10 |
| | | | £193 | 11 | 0 |
| *Less* Grant on Account | | | 10 | 0 | 0 |
| Balance of Fund, December 31st, 1921 | | | £183 | 11 | 0 |

# BALANCE SHEET, December 31st, 1921.

| LIABILITIES. | | £ | s. | d. |
|---|---|---|---|---|
| To Sundry Creditors ... ... ... ... ... ... ... | | 254 | 6 | 5 |
| ,, Subscriptions Paid in Advance :— | | | | |
| Ordinary ... .. ... ... ... .. | £87 18 6 | | | |
| Associates ... ... ... ... ... | 19 10 0 | | | |
| Students ... ... ... ... ... ... | 6 16 6 | | | |
| | | 114 | 5 | 0 |
| ,, Life Membership Reserve Account ... ... ... ... | | 261 | 5 | 0 |
| ,, Kirkpatrick Endowment Fund ... ... ... ... ... | | 50 | 0 | 0 |
| ,, Eli and Emma Sowerbutts Memorial Fund ... ... ... | | 150 | 0 | 0 |
| ,, Harry Sowerbutts Memorial Fund ... ... ... ... | | 183 | 11 | 0 |
| ,, John Walkden Memorial Fund : Balance unexpended ... | | 4 | 17 | 3 |
| ,, Balance :— | | | | |
| Brought from last Account ... ... ... | £61 10 5 | | | |
| Add Net Surplus, 1921 ... ... ... | 160 2 1 | | | |
| | | 221 | 12 | 6 |
| | | £1,240 | 7 | 2 |

| ASSETS. | | £ | s. | d. |
|---|---|---|---|---|
| By 204 Shares, £10 each fully paid, in the M.G.S.B. Coy., Ltd. | | | | |
| 72 Purchased at cost ... ... ... ... | £231 0 10 | | | |
| 132 Presented nominal value ... ... ... | 1,320 0 0 | | | |
| | 1,551 0 10 | | | |
| *Less* Depreciation ... ... ... ... | 531 0 10 | | | |
| | | 1,020 | 0 | 0 |
| ,, Subscriptions in Arrear :— | | | | |
| Ordinary .. ... ... ... ... ... | £10 1 10 | | | |
| Associate ... ... ... ... ... ... | 0 7 6 | | | |
| | | 10 | 8 | 6 |
| ,, Harry Sowerbutts Memorial Fund :— | | | | |
| National Savings Bonds ... ... ... ... | £147 1 7 | | | |
| Cash at Bank ... ... ... ... ... | 36 9 5 | | | |
| | | 183 | 11 | 0 |
| ,, Cash at Bank ... ... ... ... ... ... ... ... | | 13 | 5 | 5 |
| ,, Cash in Hand ... ... ... ... ... ... ... ... | | 13 | 2 | 3 |
| | | £1,240 | 7 | 2 |

## AUDITOR'S CERTIFICATE.

I have audited the above Balance Sheet, and certify same to be correct. I have examined and found to be in order the Shares in the Manchester Geographical Society Building Company, Limited.

JOHN THOMASON,
*Hon. Auditor.*

Manchester,
7th April, 1922.

Dr. REVENUE ACCOUNT, Year ended December, 31st, 1921. Cr.

| Dr. | £ s. d. | Cr. | | £ s. d. |
|---|---|---|---|---|
| To Expenses of Meetings ... | 140 6 10 | By Members' Subscriptions :— | | |
| „ Journal, Vol. XXXVI, *less* receipts ... | 107 4 3 | Life Transferred to Reserve Account ... | £5 5 0 | |
| „ Rent, Lighting and Insurance ... | 117 11 3 | Ordinary ... | £636 0 0 | |
| „ Salary ... | 130 10 0 | Associate ... | 73 2 6 | |
| „ Wages ... | 151 5 10 | Societies ... | 10 10 0 | |
| „ Sundry Expenses ... | 59 0 11 | Students ... | 4 4 0 | |
| „ Books, Maps, etc., Library ... | 7 1 0 | | | 723 16 6 |
| „ Repairs ... | 0 8 0 | „ Bank Interest ... | | 0 19 2 |
| „ Balance carried down ... | 11 7 7 | | | |
| | £721 15 8 | | | £724 15 8 |

| Dr. | £ s. d. | Cr. | | | | £ s. d. |
|---|---|---|---|---|---|---|
| To Transfers to Investment Depreciation Account ... | 79 9 6 | By Balance brought down ... | | | | 11 7 7 |
| „ Balance added, Balance Sheet ... | 160 2 1 | „ Shares in Building Company presented by— | | | | |
| | | Colonel E. W. Greg ... | | | | 200 0 0 |
| | | Mr. E. Steinthal ... | | | | 20 0 0 |
| | | „ Donations towards Deficit, 1919-1920 :— | | | | |
| | | Mrs. H. L. Lees ... | £2 10 0 | Mr. W. Thomson ... | 0 11 0 | |
| | | Mr. A. W. Arning . | 1 1 0 | Mr. Hugh Stowell... | 0 10 0 | |
| | | Dr. W. J. S. Bythell | 1 1 0 | Mrs. L. Taylor ... | 0 5 0 | |
| | | Mr. A. W. Wood ... | 1 1 0 | Miss D. H. Todd ... | 0 5 0 | |
| | | Miss K. Qualtrough | 1 0 0 | | | 8 4 0 |
| | £239 11 7 | | | | | £239 11 7 |

Note.—The Furniture, Fittings, Books, Maps, Lantern, Slides, and Stock of Journals which are insured for £2,000, are not included as Assets in the Balance Sheet. There are 50 Life Members (including two Honorary), and the Subscriptions of 24 of this number have been taken as income in the years prior to 1906.

The Chairman then proposed: "That the report of the Council and the Balance Sheet for 1921 as now submitted be approved and adopted."

Mr. Theodore Gregory, J.P., seconded the motion with pleasure, especially as it recorded an increase in the number of members in spite of the increased subscription. He also had further pleasure in seconding the adoption of the Report and Balance Sheet, as the latter, for the first time for some years showed a surplus on the year's working.

The motion was carried unanimously.

Mr. Elisha Bardsley, J.P., moved: "That the Officers and Council as nominated be and are hereby elected."

The Rev. J. Gordon Hayes, M.A., seconded, upon which the following were unanimously elected as Officers and Council for 1922-1923:—

**Patron.**

HIS MAJESTY THE KING.

**President.** Mr. E. W. MELLOR, J.P., F.R.G.S., F.R.P.S.

**Past-President.** Mr. HARRY NUTTALL, J.P., F.R.G.S.

**Vice-Presidents.**

Right Hon. the EARL OF DERBY, K.G., G.C.V.O.

Rt. Rev. the BISHOP OF SALFORD.

HENRY A. MIERS, D.Sc., F.R.S., Vice-Chancellor of the University.

Right Hon. the LORD MAYOR OF MANCHESTER.

Worship the MAYOR OF SALFORD.

C. W. MACARA, Bart., J.P.

JOHN S. RANDLES, M.P.

H. F. DE TRAFFORD, Bart.

JOHN AINSWORTH, C.M.G., C.B.E., D.S.O., F.R.G.S.

tain W. C. BACON, J.P., Chairman Ship Canal Company.

Mr. J. E. BALMER, F.R.G.S. (Vice-Chairman of Council).

Colonel H. T. CROOK, J.P., V.D., D.L., M.Inst.C.E. (Chairman of Council).

Hon. Prof. Sir W. BOYD DAWKINS, J.P., F.R.S.

Mr. HENRY FILDES, M.P.

Colonel E. W. GREG, J.P., C.B., F.R.G.S.

Mr. THEODORE GREGORY, F.C.A., J.P.

Mr. J. S. HIGHAM, J.P.

Mr. T. O. JACOBSEN, J.P., L.C.C., F.R.G.S.

Mr. D. A. LITTLE.

Colonel JOSEPH NALL, D.S.O., M.P.

Mr. GEORGE THOMAS, J.P.

**Trustees.**

r. HARRY NUTTALL, J.P., F.R.G.S.

Mr. SIDNEY L. KEYMER, F.R.G.S.

Mr. E. W. MELLOR, J.P., F.R.G.S., F.R.P.S.

**Hon. Treasurer.** Mr. DAVID A. LITTLE.

**Hon. Editor.** Mr. EGBERT STEINTHAL.

**Hon. Secretaries.**

RICHARD KAY, F.R.G.S.

Mr. T. W. F. PARKINSON, M.Sc., M.Ed., F.G.S.

**Hon. Secretary (Victorians).** Mr. C. A. CLARKE.

### Council.

Professor W. H. BARKER, B.Sc.
Mr. JOSEPH BERRY.
Mr. ANTHONY BURGON.
Mr. C. A. CLARKE.
Mr. T. A. EDWARDS, F.R.G.S.
Mr. GEORGE GINGER.
Mr. J. HOWARD HALL.
Mrs. H. L. LEES, F.R.G.S., A.R.C.I.
Mr. H. C. MARTIN, F.R.G.S.
Captain L. E. MATHER, F.R.G.S.
Rev. J. G. MAUDE, M.A.
Mr. F. B. OSBORNE, M.A.
Mr. EWIN PICKSTONE.
Miss KATE QUALTROUGH, F.R.G.S.
Mr. J. R. RAGDALE, C.A., J.P.
Mr. ALFRED REE, Ph.D.
Mr. J. STEPHENSON REID,
Mr. J. WALTER ROBSON, J.P.
Mr. R. A. STANIFORTH.
Mr. WILLIAM THOMSON, F.R.S.Ed.
Miss L. EDNA WALTER, M.B.E., B.Sc., H.M.I.

The Chairman then explained the absence of Mr. Mellor, their President, and why he (Col. Crook) was in the chair that day. He had had a letter from Mr. Mellor dated the 23rd inst., from the Charing Cross Hotel. It was as follows:—

Dear Colonel Crook,

I send a line on the eve of our departure for Aix-les-Bains to wish you a very successful annual meeting of the Manchester Geographical Society, and to say again how very sorry I am to be absent from the meeting. This date, however, proves to be a convenient one as it admits of my returning after the Aix treatment in time to "hold the dog," as the expression goes, while my colleagues up here go on their holidays.

It seems to me that the year which has elapsed since the last Annual Meeting is big with geographical promise. To mention only two outstanding events, there is the Expedition of the late Sir Ernest Shackleton, for whose untimely end we all grieve, and whose comrades are courageously carrying on the work, and to whose researches correct cartography of little frequented seas and shores will probably owe much.

And then there is the Mount Everest Expedition which we are all watching with so much anxiety.

Whether that expedition is able to attain the hitherto unattainable or not, it is certain that its contribution to geographical knowledge in particular, as well as to scientific knowledge in general, is bound to be very great. Most heartily do we wish success to the expedition!

Again, I thank you for undertaking my duties for me at the Annual Meeting.

With kind regards to yourself and with all good wishes to my fellow members of the Manchester Geographical Society,

I remain, Yours very sincerely,

EDWARD W. MELLOR.

The Chairman then gave the Annual Address.

Col. Crook said:—We all regret that Mr. Mellor, our President, cannot be with us to-day. His generous support, his active and continuing interest in the Society are known to all, but the full extent of his services can only be appreciated by those of us who have been associated with him in the management of its affairs.

I the more regret his unavoidable absence to-day for that it falls to my lot to deliver an address.

It is a usual practice on these occasions for the address to take the form of a review or comment upon the principal geographical events of the year past. Sometimes the practice has varied when the speaker has elected to take as his subject some special branch or research in which he has been engaged or which is of peculiar interest to him. When I learnt that I was expected to undertake duty in the absence of the President I was tempted to adopt the latter course, and take as my subject "Cartography," for at the present time the work of both the Ordnance Survey and the Hydrographical Department of the Admiralty is in some danger by reason of the urgent demand for economy in the national expenditure.

If correction, revision and production of up-to-date maps and charts fall into arrears by the reduction of staffs there is no ultimate economy. This is clearly shown by the example in the history of the Ordnance Survey, which in the "eighties" of the last century, had got into an appalling state of arrears. As far as the Hydrographical Department of the Admiralty is concerned, there has, I believe, been no such lapse. But for the unavoidable suspension during the war its progress, though it may not have been so great at one time as at another, has been continuous. The British hydrographic service is the finest in the world. It is to its supremacy we owe that the meridian of Greenwich was accepted as the international prime meridian. Our charts are used by all maritime nations. Any check to the operations of the Department or delay in making up such arrears as are due to the war would be disasterous to its reputation, a danger to shipping and consequently to the commerce of the world.

But with these few words I must leave the subject to-day and pass to another which is of deep and general interest, and which figures largely in the Report which you have just heard, namely, the position of Geographical Education. Naturally we are more particularly concerned with our own district and of the part which our Society has served, is serving, and may yet serve in its advancement.

First let me disavow any claim to speak as an educational expert. Amongst the experts the proper status of geography in all the stages of education, primary, secondary and university, appears to be a matter of some controversy, controversy mainly arising from difference of opinion as to what constitutes geography.

Moreover, there is apparent in some quarters a tendency toward the limitation or contraction of the scope of geography, or as those inclined that way would no doubt say, to the elevation of geography to a pure science. Under these circumstances it is not to be expected that the views I may express will meet with unanimous approval, nor should they be taken as an official exposition of the views of the Society, though I trust that they may be acceptable to my colleagues of the Council and to the members generally.

Now, the founders of our Society stated that its object was "to promote the study of *all* branches of geographical science, especially in its relation to commerce and civilization." At the time of its foundation, now nearly forty years since, there was, what in modern parlance would be called a boom in geography.

There was no period when geography was not deemed an essential element of a liberal education, although in these days it is rather the fashion to disdain the kind of geography which was taught two or three generations ago. I do not think it was so contemptible as it is often represented to have been. I think the dry text-book of facts came later, just before the great boom in geography. My recollection of geography as taught at my first school is that it was made both interesting and agreeable. I am sorry I cannot remember the particular text-book, but it was certainly free from that forbidding terminology which one sometimes meets with in the text-books of to-day.

In Wheeler's "Manchester Chronicle," Saturday, January 7th, 1792 (price 3½d.), there appears an advertisement headed, "At the Grammar School, Bolton," where "young Gentlemen are boarded and educated on a new, liberal and extensive plan," and "not only prepared for the University and for the learned professions, but also for trade and business." As the school was then "under the care and direction of the Revd. J. Lempriere," the Classics have first place in the advertised curriculum, then "due regard is paid to English Literature . . . the Scholars are led to express themselves with clearness, and to acquire ready and correct elocution. History, ancient as well as modern, forms likewise a portion of the exercises, and *Geography* is peculiarly attended to."

Here, one hundred and thirty years later, we are asking of our educational institutions and the Boards of Education that "peculiar attention."

Mr. Lytton Strachey, in his life of Queen Victoria, relates how the Bishops of London and Lincoln were desired by the Duchess of Kent to attend at Kensington Palace to submit her daughter, then aged eleven, to an examination. The result was all that could be desired, and "to questions in geography, the use of the globes, arithmetic, etc., the answers which the Princess returned were equally satisfactory." The use of the globes. Is not that a valuable and interesting method of imparting preliminary instruction which might very well be revived? I remember the fascination that the two big globes in my grandfather's house had for me. How seldom do we meet with them in the home or school to-day.

If we look back upon the latter half of the 19th century we shall find that the scope of geography, or what was generally assumed to be connoted, by the name, became wider and wider, and ultimately seemed to break up into a number of separate sciences, each separate science, or branch of study, taking into its own department what it regarded as its particular part of geography; so it comes about to-day that geography as a whole is in some danger of being squeezed out from the curriculum of the secondary schools, and the Board of Education would appear to be indifferent to its fate, whilst it has not yet obtained at the Universities that full recognition which we believe to be essential.

What I have called the boom period of geography was largely due to the general acceptation of the doctrine of evolution. As Dr. Marion Newbigin puts it in her admirable little book "Modern Geography," "the doctrine of evolution added a unifying and co-ordinating principle which has not only prevented geography from being crushed by the enormous recent increase in known facts, but has also for the first time raised it to the level of a science."

Now, in that designation "a science" have we not the real caûse of much of the controversy, of much of the misunderstanding concerning the place of geography in education? The primary and older sense of the word science is, as we know, the same as knowledge, but the modern definition is "knowledge reduced to a system, a *department* of knowledge so reduced." In the popular sense then do not the words "a science" convey some idea of a limitation of scope; that is, of a department or subject which may be taken or left out of an educational course, just as one might say—I am taking or not taking Greek, Chemistry, Astronomy, Geology and Botany in my course.

Whilst Dr. Newbigin does not herself suggest any limits to geography, she points out that the study of the inter-relation of phenomena is breaking down the barriers between the sciences, and consequently that much discussion has taken place as to the limits of the field of action of geography, and many definitions have been proposed with the object of setting forth those limits as clearly as possible. Dr. Hogarth, in his Edinburgh address (see p. 61) lends countenance to this separation, this specialisation of geography, in regarding it as the fecund mother of sciences whose offspring as they grow up leave the maternal home to set up for themselves.

Is this partition, this casting out, this fissiparous tendency, as Dr. Hogarth calls it, to be encouraged and facilitated, or should it be resisted? Is it possible to give geography definite bounds, and if possible is it either necessary or desirable?

The notion of geography as a self-contained science may, it seems to me, account for some part of the opposition to the full recognition of its place in education. Those responsible for the conduct of existing departments may fear that geography as a new comer, intruder or competitor, will take some of the time, and possibly some of the funds, from the departments to the success of which they are devoting their energies.

Even supposing this to be the case. If we regard geography as the science of sciences, the co-ordination and co-relationship of an infinite variety of knowledge, it must be accorded the place due to its importance. As Sir Joseph Hooker said, "it must permeate the whole of education to the termination of the University career, every subject taught having a geographical aspect."

Since Hooker's time further research, especially in the development of the idea of geographical controls, has demolished more of the barriers between the sciences and thus strengthening the claim of geography to permeate education from first to last. To restrict it to a pure science of "spatial distribution" or break it up into sections for each branch of study to deal with separately would, it seems to me, be destructive of its all embracing, vivifying and co-ordinating influence in teaching the relativity of all kinds of knowledge affecting the actions and reactions between man and his surroundings.

Why should we trouble to delimitate new boundaries when the old barriers are breaking down? Dr. Hogarth says "better delimitation is called for in the interests of geography, because lack of definition causing doubts and questions about her scope confuses the distinction between the science and its application, and may suggest to the popular mind that something is wrong with geography." I doubt whether the popular mind is greatly concerned with this distinction, but it would think that there was very much wrong with geography if the synoptic science (as Mr. Parkinson has called it) were by delimitation reduced to a new specialism. No, the function of geography must not have bounds. Its teachers must not be amenable for trespass if they traverse the field of any special branch of knowledge.

The ever-extending domain of knowledge necessitates the division of studies, but with division come the attendant risks of narrow specialism, particularism and pedantry. It is to obviate those risks that the demand is made for the wide knowledge which an eclectic comprehensive geographical teaching can give. May not this "knowledge of things" (to use Huxley's term) co-ordinated in geography do much to effect that broadening and clarification of the mind, that sense of values and the balanced judgment which in old time education was inspired by "the humanities"? That simile of geography as a mother parting with her offspring does not appeal to us. I imagine that in this manufacturing district we might prefer to put it; that in the fabric of knowledge, geography forms a great part of and gives strength to the warp on which the varied patterns of many sciences and arts are woven. To take an example.

Recently some of us enjoyed hearing an address by Professor Tout on the relationship of history and geography, in which he dwelt upon the value and importance of the services which geography rendered to history, that relationship is to geography as a whole, not merely to what has been termed historical geography. There is scarce an iota of the connotation just now given which has not its bearing on history. It is not possible to chop up geography into bits and say, these have bearings on history and those have not, Previous to the time of Buckle historians had for the most part been content with topographical geography. Buckle showed how necessary it was to take into account the physical agents by which man is influenced and man's influence on nature in directing and controlling many of its powers. Buckle, however, had not, in the "fifties" of the 19th century, that aid to "the balance and harmony of knowledge" which modern geography is providing in ever-increasing measure. Geography is doing much, and will do more, to remedy these weaknesses of history upon which the Abbé Jérôme Coignard discoursed so amusingly. Doubtless the "opinions" put into the mouth of that genial old rogue of the 18th century, by M. Anatole France, are familiar to you, but the Abbe's argument with the Historian is so apposite to our present theme, that I may be allowed to quote it :—

"What is history?" asks the Abbé. "A collection of moral tales, or rather an eloquent medley of narrative and harangue, accordingly as the historian be philosopher or rhetorician. It is possibe to find in it fine bits of eloquence, but one should not go to it in search of the truth, because the truth consists in showing the necesary relationships, lacking the power to follow the chain of effects and causes. Note that whenever the cause of an historical fact is in a fact which is in no way historic, history does not take account of it. And historical facts are strictly bound up with facts which are not historic; the result is that the events do not link themselves naturally in histories, but they are tied to one another by pure artificies of rhetoric. Observe also that the distinction between the facts which enter into history and the facts which do not do so is altogether arbitrary. The result is that, far from being a science, history is condemned by a defect of nature, to the emptiness of fiction. It is ever lacking in sequence and continuity without which it is not true knowledge. It follows clearly that one cannot draw from the annals of a people any prognostic for their future. Now, the characteristic of the sciences is to be prophetic, as is seen in the tables where the lunations, the tides and the eclipses are found calculated in advance, whereas the revolutions and the wars baffle calculation."

M. Roman (the Historian) submitted to M. l'Abbé Coignard that he only asked of history but confused verities, it is true, uncertain, mingled with errors, but infinitely precious by their subject which is man. "I know," added he, "how many of the human annals are mixed with fables and mutilated. But in default of a rigorous sequence of causes and effects, I discern a kind of plan that is sometimes lost then found again, like the ruins of those temples half buried in the sand. That alone will be for me of inestimable value. And I still trust that history, in the future, formed of abundant materials and treated with method, will rival in exactitude the natural sciences."

"Never reckon upon that," said the Abbé. "I opine, on the contrary, that the increasing abundance of memoirs, correspondence and records will present a difficult task to future historians. M. Elward, who devotes his life to the study of the English revolution, states that the lifetime of a man would not suffice to read the moiety of what was written during the troubles."

Here we see that the Abbé is oppressed by the weight of ever-accumulating facts, not foreseeing the selective synthetic methods which are the principles of modern geography and history. In fact he looks upon science as a thing apart. To-day our sympathies are with the meek Historian whom the Abbé sought to overwhelm. Geography does much to establish the relationship of things and give power to follow the chain of effects and causes, the lack of which, the Abbé said, reduced history to the vacuity of fiction. It is not a defect of nature, but a deficiency of knowledge, which deficiency the advance of geography will do more and more to rectify, until the kind of plan, which M. Roman discerned in the half-buried ruins of the temples, is fully disclosed.

Having endeavoured to set forth afresh the importance we attach to securing for geography its place in the successive grades of education, there remains the important question of how to get adequate provision made to effect that permeation of education by geography which we strongly desire.

As stated in our Report, we feel that Manchester should stand in the front rank as a centre of geographical education and research. For the teaching of geography men of the highest intellectual capacity are required, and it is to the Universities we look to provide them. At the present time competent geographers are scarce for the reason that hitherto the Universities have not accorded to geography a status commensurate with its importance or equal to that of other studies. To enable such teachers to be obtained, devotion to geographical study and research must open to them the prospect of a career, a career as honourable and as amply rewarded as that in any other department of study.

The University should have its Chair and instructional staff and its school and laboratory of geography fully equipped in apparatus.

We recognise the difficulty with which our University has had to contend on account of insufficiency of funds, and we understand that it is this difficulty which particularly stands in the way of the full development of the Geographical Department. This difficulty must be removed. The matter will not brook delay if the interests of the community are not to continue to suffer.

Mr. Stephen Leacock has lately said of the difficulty at Oxford, that it is mainly due to the fact that Henry VIII is dead. Our modern Universities do not, however, owe anything to that pious founder. But we have had our Chethams and our Oldhams in the past, and our Owens, our Whitworths, our Christies, and many others in more recent times. May we not hope then that if the necessity for immediate help is brought home, that even in these hard times there may be found those who will emulate these worthies.

There is another point in connection with the provision of funds which should be considered; that is, the question whether our enormous expenditure on education is rightly appropriated. Sir Martin Conway spoke recently of "that ghastly thing which we call education," and Mr. Blatchford put it in this way: "A collier boy may become Mayor of Chowbent, but not all the collier boys; there is only one Mayor in a town"; yet the grants are apparently administered on the assumption that all can become Mayors of Chowbent.

Neither can every one become an expert geographer. There is not room for all at the top. But it is from the top that the impulse must come. If the position of Geography is made right at the University, its proper and adequate teaching throughout the primary and secondary stages of education will soon follow.

As for our Society, it has its own sphere of labour in the diffusion of geographical knowledge. It has now, for nearly forty years, done all that its means allowed for the advancement of geography in the district of which Manchester is the centre. It could do more if its membership were increased. It could do with much greater space for its valuable library, and separate map room is urgently required. By the self-sacrificing devotion of its small staff the working expenses are, I can safely say, less than those of any society of like membership and standing.

Col. Crook added that there was much that the Society did in the way of work which was not exactly what the University or the schools could do, and there were many other matters of interest in connection with geographical education, such as that of the development of the study of regional geography, which was being increasingly well taught in the primary and secondary schools. All these things would lead to the development of that mental faculty which constituted the largest measure of all notions and ideas, however derived, and that was understanding. "Wisdom is the principal thing, and with all other getting, get understanding."

Col. E. W. Greg moved: "That the best thanks of the Society be tendered to Mr. John Thomason, A.C.A., for his services as Honorary Auditor for the past year, and that he be hereby re-elected." They were very grateful to him indeed for undertaking that duty free of charge and for having performed it so ably. He should also like to put in a word in respect to the excellent work of Mr. Sowerbutts, who was also an accountant. The accounts of the Society were most beautifully kept.

Mr. J. Howard Hall seconded the motion, which was carried unanimously.

Mr. F. B. Osborne, M.A., proposed a vote of thanks to the Lord Mayor for the use of the Lord Mayor's Parlour, and to the vote added that " his Lordship be and is hereby elected a member of the Society." Mr. Osborne said that in proposing the resolution he was glad to be able to fulfil a promise he made to the Lord Mayor just before his illness when he took the chair so admirably at the meeting in the Free Trade Hall in connection with the Mount Everest expedition. Mr. Osborne said that he told the Lord Mayor then that as Lord Mayor he was a Vice-President of the Society, but that as Mr. E. D. Simon he was not a member. He (Mr. Osborne) told his lordship that at the first opportunity he should nominate him and have him elected as a member; therefore Mr. Osborne added his election to the resolution.

It was unusual when one proposed a vote of thanks to speak of things outside it. He must say, however, that he had been struck with regard to the education being given at the Manchester University, of which he himself was a member. He believed that there was a great risk of the great city of Manchester losing the position it held ten or twenty years ago as a pioneer city—when it was true that " what Manchester says to-day England thinks to-morrow." He had had a friend come over from Japan to Manchester and the University because he understood Manchester was a pioneer city in education and science. But he had left after a year becaues he was disappointed. It was because we had lost that initiative we used to have. He did not think there was a greater example of the way we had lost that initiative than the manner in which they had let other towns get ahead of them in geographical teaching. They welcomed Mr. Barker, the new Reader in Geography at the University, but at Southampton he was Professor of Geography, and Southampton had a School of Geography and Manchester had not.

Manchester University should lead the way in the teaching of geography and in inducing the teaching of it. If the University made it an important item in their curriculum the secondary schools and the public schools were bound to follow, because it was what was required at the Universities that was taught in our secondary schools. He hoped the coming of the new Reader might be the beginning of a new era in the encouragement of geographical teaching, and that Manchester might no longer lag behind in the teaching of the subject.

Mr. John Ainsworth seconded the resolution and the addendum to it. He was sure they all regretted very much that the Lord Mayor had not been able to to be present that afternoon.

This concluded the business of the Annual Meeting.

The 1,193rd Meeting of the Society was held on Tuesday, October 10th, 1922. Mr. J. Stephenson Reid being in the chair.

The deaths of the following members, which had occurred since the last meeting, were noted with regret :—Mr. Charles Brier, Ald. John Griffiths, Messrs. Anthony Hailwood, James Hindle, L.R.A.M., W. H. Williamson, and Bishop Mercer.

The election of the following members was announced :—*Ordinary*, Mr. W. H. Barker, B.Sc., F.R.G.S., Miss Edith Edna Gee, Messrs. H. Hulme, Arthur E. Johnson, Wm. Lyth, E. D. Simon (Lord Mayor of Manchester), Miss Nora Thomas. *Associate*, Miss S. Andrew.

The Chairman remarked with pleasure on the fact that the new Syllabus of the Board of Education provided that Geography might be taken as a special subject, and that in all probability there would be a Honours School in Geography at the Manchester University during 1923.

Major Henry Darley lectured on "Adventures in Abyssinia."

The 1,194th Meeting of the Society was held on Tuesday, October 17th, 1922. Mr. George Ginger presided.

The death of Miss L. M. Warburton was noted with regret.

The Rev. M. O'Hara lectured on "Torquay and South Devon."

The 1,195th Meeting of the Society was held on Tuesday, October 24th, 1922. The Rev. J. Gordon Hayes, M.A., presided.

Captain R. W. James, M.A., B.Sc., lectured on "The Voyage of the 'Endurance.'"

The 1,196th Meeting of the Society was held on Tuesday, October 31st, 1922. Mr. George Ginger presided.

The election of the following members was announced :—*Ordinary*, Mr. Rainald Brightman, Miss Mary Chambers, Mrs. Ada Collier, Mr. Norman Edge, Mrs. L. Higham, Messrs. Harry Ingham, William Nicholas Jago (Life Member), Captain R. W. James, M.A., B.Sc., Miss Chrystie M. J. Jones, Messrs. Kitchener, Herbert A. Neave, Miss Annie Pollitt, Messrs. Roland George Searle, Arthur Albert Tulk, Miss M. G. Willis, Miss Margaret Wood, Mrs. Woodward. *Associate,* Miss Ella Farnworth, Miss Edith Hardman, Miss Marguerite Neale, Miss E. Pickering, Miss N. Pollitt, Miss M. Smethurst, and Mrs. R. A. Sterling.

Mr. Henry Holden lectured on "The South Island of New Zealand."

The 1,197th Meeting of the Society was held on Tuesday, November 7th, 1922. Colonel Hy. T. Crook, V.D., D.L., presided.

Lieut.-Commander A. S. Elwell-Sutton, R.N., B.A., F.R.G.S., lectured on "The Navigation of the Tigris above Baghdad."

The 1,198th Meeting of the Society was held on Friday, November 10th, 1922, at 3.30 p.m. Colonel Hy. T. Crook, V.D., D.L., presided.

The Rev. J. Gordon Hayes, M.A., lectured on "Did Peary reach the Pole?" (See p. 98.)

The 1,199th Meeting of the Society was held on Tuesday, November 14th 1922. Colonel Hy. T. Crook, V.D., D.L., presided.

The Rev. Alexander Taylor, M.A., lectured on "Across the High Pyrennees to the Republic of Andorra."

The 1,200th Meeting of the Society was held on Tuesday, November 21st, 1922. Colonel Hy. T. Crook, V.D., D.L., presided.

Mr. W. H. Barker, B.Sc., F.R.G.S., lectured on "The Gold Coast Colony." (See p. 156.)

The 1,201st Meeting of the Society was held on Tuesday, November 28th, 1922. Colonel Hy. T. Crook, V.D., D.L., presided.

The Rev. A. B. Fisher, C.F., F.R.G.S., lectured on "Down the Nile from Source to Outlet."

The 1,202nd Meeting of the Society was held on Tuesday, December 5th, 1922. Colonel Hy. T. Crook, V.D., D.L., presided.

The election of the following members was announced: *Ordinary,* Mr. Frederick Foxall (President of Manchester Rotary Club), Miss Mary Hay, Mr. A. Reginald Mead, Miss Effie Moyes, Mrs. H. Prestwich, Messrs. F. Cawley Roberts, Cyril H. Saunders, Miss Phyllis Smith, Mr. R. H. Swainson (Secretary, Y.M.C.A.). *Associate,* Miss Elsie Garlick, Mrs. Margaret Oldham.

The Chairman referred to the proposal for establishing a Chair of Geography at the University, and announced that the President, Mr. E. W. Mellor, had forwarded a cheque for £1,000 to inaugurate the fund. The members heard also with much gratification that the President had given the Society £200 to enable the finances to be put in order.

Major Raymond E. Priestley, M.C., B.A., lectured on "Antarctic Exploration with Shackleton and Scott."

The 1,203rd Meeting of the Society was held on Tuesday, December 12th, 1922. Colonel Hy. T. Crook, V.D., D.L., presided.

Mr. H. W. Ogden, B.Sc., lectured on "The Ribble Valley."

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The 1,204th Meeting of the Society was held on Tuesday, December 19th, 1922. Colonel Hy. T. Crook, V.D., D.L., presided.

The death of Mr. Edward Pilkington, J.P., was noted with regret.

The election of the following members was announced :—*Ordinary*, Mr. Thomas Ogden. *Associate*, Miss C. Cardwell.

In consequence of Colonel Ainsworth having removed to Guernsey, Mr. T. Wilson Erskine lectured on "Geography Through a School Camera."

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The Annual Children's Meeting was held on Friday, December 22nd, 1922, at 6.0 p.m. The Rev. Arthur Grime should have spoken on "Oberammergau and Back," but unfortunately was prevented by illness, and Mr. George Ginger gave a talk on "Sunny Sicily."

# List of Maps, Books, Journals, etc.,

ACQUIRED BY THE SOCIETY.

FROM JANUARY 1st, 1921, TO DECEMBER 31st, 1922.

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## Maps.

### EUROPE.

Katalog over Landkarter, 1921, 1922. Kristiania: Norges Geografiske Opmaaling. 1921, 1922. *Norges Geografiske Opmaaling.

Beretning om Norges Geografiske Opmaalings Virksomhet i Tidsrummet, 1 Juli 1919—30 Juni 1920. 1 Juli 1920—30 Juni 1921. Kristiania: 1921, 1922. *Norges Geografiske Opmaaling.

Norway. Topografisk kart over Kongeriket Norge. 1/100,000. Gradavdeling B, 35 Stord; E, 32 (østlige del). Kristiania: Norges Geografiske Opmaaling, 1921. *Norges Geografiske Opmaaling.

Norway. Landgeneralkart over Norge. 1/250.000. Blad IX Enningdalen; Blad XXIV Rana. Kristiania: Norges Geografiske Opmaaling, 1921. *Norges Geografiske Opmaaling.

Norway. Topografisk Beskrivelse. Hefte 1. til Gradavdelingskart; M. 10, Tysfjord. Maalestok, 1/100.000. Kristiania: Norges Geografiske Opmaaling. 1922. *Norges Geografiske Opmaaling.

Catalogue des Cartes, Plans and Autres Ouvrages publiés par le Service Géographique de l'Armée. 1er Janvier, 1921. 24 Index Maps. Paris: Service Géographique de l'Armée, 1921. *Ministere de la Guerre.

### ASIA.

Postal Map of China, 1920. Scale, 1/2,000.000. Shanghai: Supply Department of the Directorate General of Posts, 1921. *The Secretary, Directorate General of Posts.

### AFRICA.

Gold Coast Survey. Wall Map of the Gold Coast and its Dependencies and that part of Togoland mandated to Great Britain. Scale, 1/375.000, or 1.69 inches to 10 miles. Published by the authority of Brig.-Gen. Sir F. G. Guggisberg, K.C.M.G., D.S.O., Governor, under the direction of Lt.-Col. R. H. Rowe, D.S.O, M.C., R.A., Surveyor General. Edinburgh: W. and A. K. Johnston. 1922. (Price £2 10s. net, mounted on cloth and rollers, varnished.) *Lt.-Col. R. H. Rowe. D.S.O., M.C., R.A., per Messrs. W. and A. K. Johnston, Ltd.

Gold Coast Survey. General Map of the Gold Coast and its Dependencies and that part of Togoland mandated to Great Britain. Scale, 1/1,000,000, or 1.014 inches to 16 miles. Lt.-Col. R. H. Rowe, D.S.O., M.C., R.A., Surveyor General. Edinburgh: W. and A. K. Johnston, Ltd., 1922

(Two copies.) (Prices, mounted on linen, folded, 12/- net; paper, flat, 7/- net.) *Lt.-Col. R. H. Rowe, D.S.O., M.C., R.A., per Messrs. W. and A. K. Johnston, Ltd.

Gold Coast Survey. The Standard Map of the Gold Coast Colony and its Dependencies, and that part of Togoland mandated to Great Britain. (To be completed in 33 sheets.) Scale, 1/125,000, or 1.014 inches to 2 miles. Issued by authority of Brig.-Gen. Sir F. G. Guggisberg, K.C.M.G., D.S.O., Governor. Surveyed under the direction of Lt.-Col. R. H. Rowe, D.S.O., M.C., R.A., Surveyor General, and Maj. G. H. Bell, M.C., Director Topographical Branch. Sheets North B-30/L-IV Koforidua, North B-30/R-II Accra. Edinburgh : W. and A. K. Johnston, Ltd., 1922. (Two copies.) Prices, each sheet, mounted on linen, folded, 9/6 net.; paper, flat, 5/- net.) *Lt.-Col. R. H. Rowe, D.S.O., M.C., R.A., per Messrs. W. and A. K. Johnston, Ltd.

## CANADA.

Geological Map of the Dominion of Canada and Newfoundland. Scale, 1/6,336,000. Ottawa : Department of Mines, Geological Survey, Canada. *The Director of the Survey.

## PACIFIC.

Pacific Ocean. Scale, 1/37,566,325. London : Edward Stanford, Ltd., 1922. (Prices, coloured sheet, 4/-; mounted to fold in case, 6/6.) *The Publisher.

## ATLASES, PHOTOGRAPHS, Etc.

Atlas of American Agriculture. Prepared under the supervision of O. E. Baker, agriculturist. Part II. Climate, Section 1, Frost and the Growing Season. Part V, The Crops, Section A, Cotton. Part IX, Rural Population and Organizations, Section 1, Rural Population. Washington : U.S. Department of Agriculture, 1918, 1919, 1920. *The Librarian, U.S. Department of Agriculture.

A List of Geographical Atlases in the Library of Congress, with Bibliographical Notes. Compiled under the direction of Philip Lee Philips. Vol. IV. Washington : Library of Congress, 1920. *The Library of Congress.

Twenty-seven Photographs of Buenos Aires and Neighbourhood, taken about 1850-1860. *Mr. A. W. Arning.

Lantern Slides and Lectures, by Horace C. Martin, F.R.G.S. 1. The Solar System and Glimpse at Stellar Universe, 69 slides. 2. Movements of Members of Solar System, 42 slides. 3. A Brief History of the Earth, 71 slides. 4. Volcanoes, Earthquakes, Geysers, Corals, etc., 62 slides. 5. Rain, Rivers, Glaciers, Ice, the Sea, etc., 77 slides. 6. The Fjords of Norway and Excursions, 129 slides. 7. City and Lake of Geneva and Excursions, 51 slides. 8. Valleys of the Rhone and Aar and Bernese Oberland, 79 slides. 9. The Lakes of Killarney and Excursions, 61 slides. 10. The Isle of Man, its Beauty Spots, Antiquities, etc., 71 slides. 11. The Legends and Superstitions of the Isle of Man. 12. Various Slides, 82 slides. *The " Victorians."

Lantern Slides (557). 139 England (Clovelly, Kinder Scout, Lake District). 260 Europe (Norway, Italy, Turkey, Greece). 91 Asia (Japan, Hong Kong). 48 Africa (Morocco, Canary Islands, Egypt). 12 Canada. One Pacific Ocean. Six Spitzbergen. *Mr. Abel Heywood, J.P.

Lantern Slides. India. A Religious Fakir. Agra : Taj Mahal from the other side of River. Delhi : Kutb Minar. Tomb of Altamsh, 1235 A.D. Delhi : Shah Jehan's Audience Hall. Screen dividing the Ladies' Chamber. *Mr. J. W. Price. F.R.G.S.

Lantern Slide. Map of New Zealand. *Mr. Hy. Holden.

Lantern Slides. The Society's Collection contains 1,650 British Isles, 1,750 Europe, 1,740 Asia, 1,825 Africa, 2,080 America, 470 Oceania. 200 Polar Regions, 160 Cartography, etc., 230 Astronomy, etc., 300 Biological, Commercial, Botanical, Historical, etc., and are available for the use of members.

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## Books.

### GENERAL.

Essays in Historical Geography and on Kindred Subjects. By James R. McClymont, M.A. London : Bernard Quaritch, M.A., 1921. (Price 10/6.) (200 Copies Printed.) *The Publisher.

Handbook of Geography. Descriptive and Mathematical. By Emil Reich. Maps. London : 1912. *Miss K. Qualtrough, F.R.G.S.

Modern Geography. By Marion I. Newbigin. London. *The Secretary.

An Introduction to Applied Geography. By Alexander Stevens, M.A., B.Sc. Maps, Diagrams, Illustrations. London : Blackie & Son, 1921. (Price 6s.) *The Publishers.

An Elementary Geography of the World, Regional and Economic. In six parts. Part I, Africa ; II, Australasia ; III, America ; IV, Asia ; V, Europe ; VI, British Islands. By J. W. Page, F.R.G.S. London : Macdonald and Evans. 1922. (Price. Parts I, II, III, 8d. each net ; Parts IV, V, VI, 9d. each net.) *The Publishers.

Geography and World Power. By James Fairgrieve, M.A., F.R.G.S. Map, Diagrams. Second Impression. London : 1917. *Miss K. Qualtrough, F.R.G.S.

Cambridge Geographical Text Books. Senior. By G. F. Bosworth, F.R.G.S. Maps and Diagrams. Cambridge : University Press. 1922. (Price, 7/6.) *The Syndics of the Cambridge University Press.

The Geographical Teacher, the Organ of the Geographical Association. Vol X. Index. Nos. 59-63. 1921, 1922.

The Countries of the World : Being a popular description of the various Continents, Islands, Rivers, Seas, and Peoples of the Globe. By Robert Brown, M.A., Ph.D., etc. Six Vols. Maps and Illustrations. London. *The Secretary.

The Earth and Its Inhabitants. The Universal Geography. By Elisée Reclus. Edited by E. G. Ravenstein, F.R.G.S., F.S.S., etc., and A. H. Keane, B.A. Vols. 1-12. Maps and Illustrations. London. *The Secretary.

The Earth and Its Inhabitants. The Universal Geography. By Elisée Reclus. Edited by A. H. Keane, B.A. Vol. 15-18. Maps and Illustrations. London.

Egypt and Iceland in the Year 1874. By Bayard Taylor. London: 1875. *Mr. Abel Heywood, J.P.

The Northward Course of Empire. By Vilhjalmur Stefansson.. With an Introduction by Dr. Edward William Nelson, Chief of the U.S. Biological Survey. Map and Illustrations. London: 1922. *Miss K. Qualtrough, F.R.G.S.

Homer and History. By Walter Leaf, Litt.D., Hon. D.Litt. Maps. London: 1915. *Miss K. Qualtrough, F.R.G.S.

The Ruling Races of Prehistoric Times in India, South-Western Asia and Southern Europe. By J. F. Hewitt. Maps and Diagrams. 2 Vols. Westminster: 1894 and 1895. *Miss K. Qualtrough, F.R.G.S.

A Manual of Ancient Sculpture: Egyptian—Assyrian—Greek—Roman. By George Redford, F.R.C.S. Second Edition, enlarged. Map and Illustrations. London: 1886. *Miss K. Qualtrough, F.R.G.S.

Legendary Islands of the Atlantic. A Study in Mediæval Geography. By William H. Babcock. Maps. New York: American Geographical Society, Research Series, No. 8, 1922. *The Editor, Mr. W. L. G. Joerg.

A History of the Life and Voyages of Christopher Columbus. By Washington Irving. 4 Vols. Maps. London: 1828. *The Secretary.

Physiography: An Introduction to the Study of Nature. By T. H. Huxley, F.R.S. Maps, Diagrams, Illustrations. Third Edition. London: 1881. *The Secretary.

Notes on Climate and other Subjects in Eastern Mediterranean and Adjacent Countries. Prepared on behalf of the Admiralty and the War Office. Maps. London: H.M. Stationery Office, 1916. (Price, 5/- net.) *The Controller, H.M. Stationery Office.

The Geological Work of Charles Lapworth, M.Sc., LL.D., F.R.S., F.G.S., Professor of Geology and Physiography at the University of Birmingham. By W. W. Watts. Birmingham: Natural History and Philosophical Society Proceedings, Special Supplement to Vol. XIV, 1921. (Price, 2/-.) *The Publishers.

Map Projections. By Arthur R. Hinks, C.B.E., M.A., F.R.S. Illustrated. Second Edition, Revised and Enlarged. Cambridge: University Press. 1921. (Price, 12/6 net.) *The Syndics of the Cambridge University Press.

A Study of the Map Projections in General. By Oscar S. Adams. Illustrated. Washington: U.S. Coast and Geodetic Survey Special Publication, No. 60. 1919. *The Superintendent.

Photo-Reproductive Methods and Processes used by the Survey of Egypt. By G. Douglas, M.B.E., F.R.P.S., Superintendent of the Photo Process Office. Illustrated. Cairo: Survey of Egypt, Paper No. 36, 1920. (Price, P.T. 5.) *The Surveyor-General.

Latitude Developments connected with Geodesy and Cartography, with tables, including a table for Lambert Equal—Area Meridional Projection. By

Oscar S. Adams. Washington : U.S. Coast and Geodetic Survey, Special Publication, No. 67, 1921. *The Superintendent.

Calendario 1922, Anno VI, delle Città Italiane Illustrato. A cura di G. B. Rossi. Maps and Illustrations. Torino : R. Orfanotrofio Militare Nazionale, 1922. *The Publishers.

Rapport sur Les Travaux Exécutés en 1914. (Période du 1er Janvier au 31 Juillet.) Index Maps. Paris : Service Géographique de l'Armée, 1921. *Ministère de la Guerre.

A First Book of Commercial Geography. By T. Alford Smith, B.A. (Lond.), F.R.G.S. Maps, Diagrams, Illustrations. London : 1920

The "Manchester Guardian" History of the War. Maps, Plans, Portraits, Illustrations, etc. 9 Vols. Manchester : 1914-20. *The Secretary.

The "Manchester Guardian" Commercial Year Book, 1921, 1922.

The "Manchester Guardian" Commercial. A Weekly World-Review of Industry, Trade and Finance. Vol. II, Nos. 5-26; Vol. III, Nos. 1-30; Vol. IV, Nos. 1-26; Vol. V, Nos. 1-26. 1921, 1922. *The Secretary

Prospettive Economiche, 1922. Giorgio Mortara. Opera edita sotto gli Auspici della Università Bocconi di Milano. Città di Castello : Società Tipografica "Leonardo Da Vinci," 1922. *Università Commerciale Bocconi, Milan.

The Velvet and Corduroy Industry : A brief account of the various processes connected with the Manufacture of Cotton Piece Goods. By J. Herbert Cooke. Diagrams and Illustrations. (Pitman's Common Commodities and Industries Series.) London : Sir Isaac Pitman and Sons, Ltd., 1922. (Price, 3/- net.) *The Author.

"Conocimientos Oceanográficos de los Primeros Navegantes Españoles." Por el Dr. D. Rafael de Buen, Subdirector del Instituto Español de Oceanografia. con motivo del IV Centenario de la Vuelta al Mundo por Juan Sebastián del Cano. San Sebastian : Sociedad de Oceanografia de Guipúzcoa, 1922. *The Publishers.

"Alimentación y Oceanografia." Conferencia dada en San Sebastian, con motivo de las fiestas de Juan Sebastián del Cano, en Septiembre de 1922, por D. José Giral y Pereira. San Sebastian : Sociedad de Oceanografia de Guipúzcoa, 1922. *The Publishers.

Guide Bibliografiche. Lingua e Lettere Latine—Vincenzo Ussani. Roma : Fondazione Leonardo per la Cultura Italiana, 1921. *Commissariato Emigrazione.

The Ramblers' Handbook. The Official Year-Book of the Ramblers' Federation for the year 1923. Maps and Illustrations. Manchester. *Mr. J. Ashton.

The Incorporated Accountants' Year Book, comprising List of Members, Articles and Bye-Laws. London : The Society of Incorporated Accountants and Auditors, 1921, 1922. *The Council.

## BRITISH ISLES.

Dent's Historical and Economic Geographies. Great Britain and Ireland. By Horace Piggott, M.A., Ph.D., and Robert J. Finch, F.R.G.S. Maps and Diagrams. London : J. M. Dent and Sons. 1922. *The Publishers.

Provinces of England : A Study of some Geographical Aspects of Devolution. By C. B. Fawcett, B.Litt., M.Sc. Maps and Diagrams. London : 1919.

English Coastal Evolution. By E. M. Ward, M.A., B.Sc. Maps, Plans and Illustrations. London : 1922. *Miss K. Qualtrough, F.R.G.S.

Hampshire by Telford Varley. Maps, Diagrams and Illustrations. Cambridge County Geographies. Cambridge : University Press, 1922. (Price, 3/6 net.) *The Syndics of the Cambridge University Press.

Banffshire. By W. Barclay. (Cambridge County Geographies.) Maps, Diagrams and Illustrations. Cambridge : University Press, 1922. (Price, 3/6.) *The Syndics, Cambridge University Press.

The Evolution of a Coast Line—Barrow to Aberystwyth and the Isle of Man. with Notes on Lost Towns, Submarine Discoveries, etc. By William Ashton. Maps, Diagrams and Illustrations. London and Southport : 1920. *Miss K. Qualtrough, F.R.G.S.

The Official Handbook of Manchester and Salford and Surrounding District, with information on Local Institutions and Societies, 1921. Manchester : 1921.

The Manchester and Salford Official Red Book for 1921. Eleventh Annual Edition. Manchester : 1921.

The "Manchester Guardian" Centenary Number, May 5th, 1921. The "Manchester Guardian, the New Royal Exchange Supplement. October 8th, 1921. *The Secretary.

The "Manchester City News" Royal Exchange Special Number, October 8th, 1921. *The Secretary.

Barograms Recorded by the Right Rev. the Bishop of Salford's Barograph at St. Bede's Lodge, Alexandra Park, Manchester. Vol. VI. 7th November, 1920, to 19th November, 1921. *The Right Rev. the Bishop of Salford.

Rambles Round Rossendale. By J. Marshall Mather. Illustrated. Rawtenstall : 1888. *The Secretary.

A Thousand Miles of Wandering in the Border Country. By Edmund Bogg. Map and Illustrations. Newcastle and York : 1898. *The Secretary

The West Riding of Yorkshire. (Cambridge County Geographies.) By Bernard Hobson, M.Sc., F.G.S. Maps. Diagrams and Illustrations. Cambridge : University Press, 1921. (Price, 2/9 net.) *The Syndics of the Cambridge University Press.

Upper Wharedale. Being a complete account of the History, Antiquities and Scenery of the picturesque Valley of the Wharfe from Otley to Langstrothdale. By Harry Speight. Map and Illustrations. London : 1900. *The Secretary.

From Edenvale to the Plains of York : A Thousand Miles in the Valleys of the Nidd and Yore. By Edmund Bogg. Illustrated. Leeds. *The Secretary.

Handbook to Hull and the East Riding of Yorkshire. Prepared for the Members of the British Association for the Advancement of Science. Hull Meeting, 1922. Edited by T. Sheppard, M.Sc., F.G.S. Maps, Illustrations. Hull : 1922.

Handbook to Cardiff and the Neighbourhood. Prepared by various Authors for the Publication Sub-Committee, and Edited by Howard M. Hallett, F.E..S. Map. Cardiff: British Association, 1920. *The Secretary.

Old and New Edinburgh: Its History, its People, and its Places. By James Grant. Plans and Illustrations. Three Vols. London. *The Secretary.

Edinburgh's Place in Scientific Progress. Prepared for the Edinburgh Meeting of the British Association by the Local Editorial Committee. Illustrated. Edinburgh: 1921.

Official Guide to the Abbey, Palace and Environs of Holyrood House. With a Historical Sketch by the Right Hon. Sir Herbert Maxwell, Bart., F.R.S., LL.D., D.C.L. Plans and Illustrations. Edinburgh: 1921. *The Secretary.

The Provinces of Ireland. Ulster, Munster. Edited by Gorge Fletcher. Maps, Illustrations. Cambridge: University Press, 1921. (Price, 6/6 net each.) *The Syndics of the Cambridge University Press.

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# Rules.

## I. OBJECT AND WORK.

The object of the Manchester Geographical Society is to promote the study of all branches of Geographical Science, especially in its relations to commerce and civilisation.

The work of the Society shall be :—

1. To further in every way the pursuit of the science; as, by the study of official and scientific documents, by communications with learned, industrial and commercial societies, by correspondence with consuls, men of science, explorers, missionaries, and travellers, and by the encouragement of the teaching of geography in schools and colleges.

2. To hold meetings at which papers shall be read, or lectures delivered by members or others

3. To examine the possibility of opening new markets to commerce and to collect information as to the number, character, needs, natural products and resources of such populations as have not yet been brought into relation with British commerce and industry.

4. To promote and encourage, in such way as may be found expedient, either alone or in conjunction with other Societies, the exploration of the less known regions of the earth.

5. To inquire into all questions relating to British and Foreign colonisation and emigration.

6. To publish a Journal of the proceedings of the Society, with a summary of geographical information.

7. To form a collection of maps, charts, geographical works of reference, and specimens of raw materials and commercial products.

8. The Society shall not enter into any financial transactions beyond those necessarily attached to its declared object, and shall not make any dividend, gift, division, or bonus in money unto or between any of its members.

## II. ORGANISATION.

9. The Society shall consist of ordinary, associate, corresponding, and honorary members.

10. A Council shall be chosen annually from the ordinary members to conduct the affairs of the Society. It shall consist of a President, four or more Vice-Presidents, a Treasurer, two or more Honorary Secretaries (including a Secretary for Foreign Correspondence) and twenty-one Councillors. *The President shall not be eligible for re-election after having occupied such office for three years consecutively but upon retiring from office shall be styled "Past President" and shall be an ex-officio member of the Council so long as he remains a member of the Society.*

11. There shall be three Trustees elected by the Society, who shall hold office until death, disability, insolvency, or resignation. They shall be members of the Council by virtue of their office.

12. Any vacancy occurring in the Council during the current year may be filled up by the Council.

## III. ELECTION OF MEMBERS.

13. Every candidate for admission into the Society as an ordinary or an associate member must be proposed by a member. The proposal shall be read out at the next Ordinary Meeting of the members, and any objection shall be forwarded in writing to the Secretary within seven days.

14. The election of members is entrusted to the Council. The names of those elected shall be announced from the chair at the next Ordinary Meeting after the election.

15. The Secretary shall within three days forward to every newly-elected member notice of his election, a copy of the Rules of the Society, and a card announcing the days on which the Ordinary Meetings will be held during the session. But the election of an ordinary or associate member shall not be complete, nor shall he be permitted to enjoy the privileges of a member, until he shall have paid his first year's subscription. Unless such payment be made within three calendar months frcom the date of election the election shall be void.

16. The Council shall have power to elect honorary and corresponding members.

17. Women shall be eligible as members and officers of the Society.

## IV. PAYMENTS.

18. An ordinary member shall pay an annual subscription of *£1 10s. 0d.* or he may compound by one payment of *£15 0s. 0d.* An associate member shall pay an annual subscription of *£0 15s. 0d. Students under the age of twenty-one years may be admitted to the meetings and accorded the use of the Library, Map Room, etc., at an annual fee of £0 10s. 6d.* The Society's year shall begin on the first day of January.

19. Members shall not be entitled to vote or to enjoy any other privilege of the Society so long as their payment shall continue in arrear, but associate members shall not vote nor shall they take any part in the government of the Society.

20. The first annual payment of a member elected in November or December shall cover his subscription to the 31st December in the year following.

21. On the first day of January in each year there shall be put up in the rooms of the Society a complete list of the members with the amount of their subscription due, and as the amounts are paid the fact shall be marked on the list.

22. Notice shall be sent to every member whose subscription shall not have been paid by the first of February, and if the arrears are not discharged by the first of July the Council may remove the member from the list of members. Any member, whose subscription is in arrear for two years shall not be entitled to receive the Journal of the Society.

## V. MEETINGS.

23. The meetings of the Society shall be of three kinds—Ordinary, Annual, and Special.

24. In all meetings a majority of those present shall decide all questions, the President or Chairman having a casting vote in addition to his own.

### Ordinary Meetings

25. The Ordinary Meetings of the Society shall be held once a month, from the month of October to the month of May, or oftener, if judged expedient by the Council.

26. All members whose subscriptions are not in arrear shall have a right to be present. All ordinary members shall have the privilege of introducing one visitor.

27. The order of the proceedings shall be as follows :—

- (a) The minutes of the last meeting to be read and if correctly recorded they shall be signed by the Chairman.
- (b) Presents, whether of money, books, maps, charts, instruments or specimens made to the Society to be announced.
- (c) The election of new members to be declared and the names of candidates to be read.
- (d) Papers and communications to be read and discussed.

28. At these meetings nothing relating to the rules or management shall be brought forward, but the minute book of the Council shall be on the table at each meeting for the inspection of any member, and extracts therefrom may, with the consent of the chairman, be read to the meeting on the requisition of any member.

29. On occasions of exceptional interest the Council may make provision for a larger admission of visitors.

### Annual Meetings.

30. The Annual Meeting of the members shall be held at such time and place as the Council may determine.

31. Fourteen days' notice of such meeting shall be sent to every member within the United Kingdom who has given his address to the Secretary, and notice of the meeting shall be advertised in such newspapers as the Council may direct.

32. The object of this meeting shall be to receive the Annual Report of the Council and the Treasurer's Balance Sheet, to hear the President's address, to elect the Council and officers for the ensuing year, and to transact any other business.

33. Any two ordinary members may nominate candidates for the Council or for office not later than one week prior to the day of election, and the names of candidates so nominated shall be at once put up in the rooms of the Society. The election of the Council and officers shall be by ballot.

### Special General Meetings.

34. The Council may call a Special General Meeting of the Society whenever they shall consider it necessary, and they shall do so if required by 20 ordinary members.

35. A week's notice of the time and object of every Special Meeting shall be sent to all members. No other business shall be entertained than that of which notice has been thus given.

36. Twenty ordinary members shall form a quorum.

## VI. COUNCIL AND OFFICERS.

### The Council.

37. The government of the Society shall be entrusted to the Council, subject to the rules of the Society.

38. The Council shall annually elect a Chairman and Vice-Chairman. *The Chairman of the Council shall not be eligible for re-election after having occupied such office for three years consecutively.*

39. The President or the Chairman, or any three members of the Council, may at any time call a meeting thereof, to which every member of the Council shall be summoned.

40. Seven shall form a quorum.

41. In order to secure the most efficient study and treatment of the various subjects which constitute the chief work of the Society, the Council may appoint Committees for special purposes. These Committees, with the approbation of the Council, may associate with themselves any persons—whether members of the Society or not—from whom they may desire to obtain special assistance or information. The Committee shall report to the Council the results of their proceedings.

42. The President, Chairman, Vice-Chairman of the Council, and the Honorary Secretaries, shall, by virtue of their offices, be members of all Committees appointed by the Council.

### President and Vice-Presidents.

43. The President is, by virtue of his office, the chairman of all the meetings of the Society. In the absence of the President, one of the Vice-Presidents may preside.

### Chairman of the Council.

44. It is the duty of the Chairman of the Council to see that the rules are properly observed, to call for reports and accounts from Committees and officers, and to summon, when necessary, special meetings of the Council and of Committees.

### Treasurer.

45. The Treasurer has the charge of all accounts; he shall pay all accounts due by the Society after they have been examined and approved by the Council.

46. He shall see that all moneys due to the Society are collected, and shall have power, with the approval of the Council, to appoint a collector. All moneys received shall be immediately paid to the bankers of the Society.

47. The bank passbook and the book of accounts shall be laid upon the table at every ordinary meeting of the Council.

48. The accounts shall be audited annually by *a professional accountant or* two members who shall be elected at the Annual Meeting or at an ordinary meeting at least one month before the Annual Meeting.

### Secretaries.

49. The duty of the Honorary Secretaries shall be :—
    - (a) To conduct the correspondence of the Society and of the Council.
    - (b) To attend the meetings of the members and of the Council, and minute their proceedings.
    - (c) At the ordinary meetings, to announce gifts presented to the Society since their last meeting; to read the names of all new members and of candidates for admission, and the papers communicated to the Society, which have been directed by the Council to be read.
    - (d) To have immediate superintendence of all persons employed, to make arrangements for the meetings of the Society, and to take charge of all maps, books, furniture and other effects.

50. It shall be the more especial duty of one of the Honorary Secretaries to conduct, as may be directed by the Council, correspondence with Foreign Societies, and with persons resident abroad.

51. In addition to the Honorary Secretaries, there shall be a paid Secretary appointed by the Council, whose duties shall be to assist the Honorary Secretaries, to issue the notices of the Council and of the Society, and to act under the instructions of the Council.

52. *No alteration shall be made in these rules except at the Annual Meeting of the Society, or at a Special Meeting called for that purpose by fourteen days' notice, specifying the proposed change, and agreed to, in either case, by three-fourths of the members present.*

---

The foregoing rules, as now amended, were approved and adopted at a meeting of the members of the Society, of which due notice had been given to the members, held in the Town Hall, Manchester, Wednesday, October 3rd, 1894.

(Signed) GEORGE, President.
S. ALFRED STEINTHAL, Chairman.
F. ZIMMERN, Honorary Secretary.
JAS. D. WILDE, M.A., Honorary Secretary.
ELI SOWERBUTTS, Secretary.

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[Copy.]

It is hereby certified that this Society is entitled to the benefit of the Act 6 and 7 Vict., Cap. 36, intituled "An Act to exempt from County, Borough, Parochial, and other Local Rates, Lands and Buildings occupied by Scientific or Literary Societies."

Seal of Registry of
Friendly Societies.

This 15th day of January, 1895.
E. W. B

Note: The amendments in italics were approved and adopted at the Annual Meeting held on Friday, May 7th, 1920.

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1925

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Photo by Lafayette].

Col. HENRY T. CROOK,
J.P., V.D., D.L., M.Inst.C.E.

The Journal

OF THE

Manchester Geographical Society.

* * *

# THE HISTORY OF CARTOGRAPHY.

By W. H. Barker, B.Sc., F.R.G.S.

Accompanying this number of the *Journal* is the handbook of a Map Exhibition held in the Whitworth Hall during January, 1923, under the joint auspices of the University of Manchester and the Manchester Geographical Society. The Exhibition comprised the extensive collection of *fac-similes* and reproductions of manuscript maps and globes, early printed maps and modern Ordnance Survey maps, mainly contained in the two map collections placed in the University for the use of students. The one, made by Colonel Mills and known as the Mills Collection, is illustrative principally of geographical discovery and travel. This collection is accompanied by a good working library of books and pamphlets. The other, made by the late Mr. Booker, and known as the R. P. L. Booker Collection, consists of a representative series of printed maps of the British Isles and the counties or parts thereof.[1]

Sir Frederick Lugard opened the Exhibition on Thursday, January 25th, the Senior Pro-Vice-Chancellor (Mr. E. Fiddes) being in the chair. Among those present were the late Lord Sheffield, Mr. Mellor, Colonel H. T. Crook, Sir George Fordham, Colonel Mills, and Dr. W. W. Atwood (President of Clark University, Worcester, Mass.).

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[1] An exhibition was held simultaneously at the John Rylands Library of some original maps and atlases contained in that library. A catalogue is in preparation and will be issued as a Bulletin of the Library.

During the ensuing week the following lectures were given in the Whitworth Hall :—

(1) "The Evolution of Maps of the British Isles," by Sir George Fordham.[1]
(2) "Mediæval Mappæmundi," by Michael C. Andrews.[2]
(3) "Age of Discovery Maps," by C. S. S. Higham, M.A.
(4) "Ordnance Survey Maps," by Colonel H. T. Crook.
(5) "Early Maps of London," by W. H. Barker, B.Sc.

The exhibition coincided with the decision of the University to establish an Honours School in Geography (see p. 187), thus initiating a new epoch in geographical studies in our University.

The handbook sets out in catalogue form much useful information on the history of cartography, and the notes which follow only supplement what is there given.

### ANCIENT MAPS.

The origins of cartography are lost in obscurity. Probably the art developed through the necessity of showing the relationship of one place to another. At first, no doubt, distances and directions must have been approximate; later, when land values increased, as in Egypt, and travel extended, as under Phœnicians and Greeks, possibly greater accuracy was required and obtained. The Turin Papyrus, the Madaba Mosaic, the Chinese Maps and the Peutinger Table may be cited as examples of these early and diverse maps.

But cartography as a method of expressing space ideas, had other uses than the plotting of ascertainable and measurable distances and directions. The Greek geographers showed by means of maps and globes their mathematical and astronomical conception of the globe, with its known and unknown lands. The mediæval scribes gave cartographic form to theological and philosophical speculations of the earth.[3]

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[1] Published by the Manchester University Press, 1/-.

[2] M.S. copy (illus.) in the University Library.

[3] Cp. Orbis Terrarum. Gilbert Murray. *Geographical Teacher*, Spring, 1921.

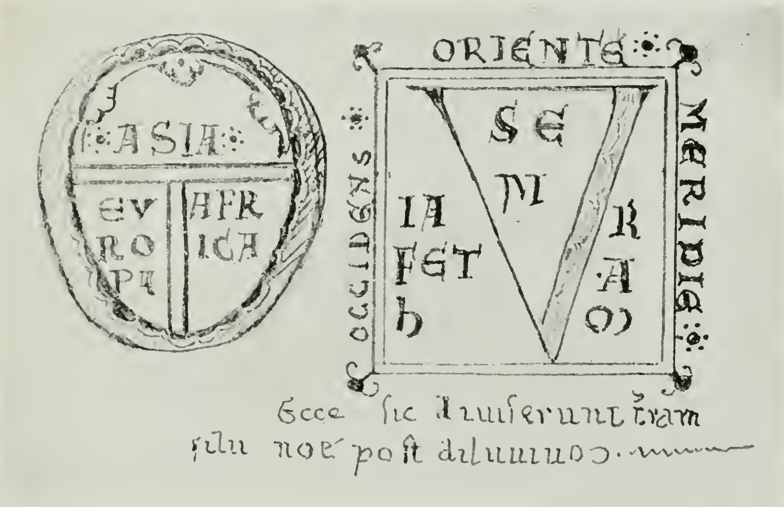

Fig. 1.

Œcumenical Tripartite T-O and []-V Isidore Etymologium.
Boulogne-sur-mer, Bibliothèque Publique, Cod. No. 1.
Saec. XII.

Size of original.

It has been said the Greeks measured the earth by the stars and the Romans by milestones. The maps of Ptolemy, re-drawn at the close of the fifteenth century from data in his "Geography," are based on the longitudes and latitudes which he gives. The Peutinger Table, dating from 1275, but probably typical of the "*Itineraria Picta*" of the Romans, is a distorted diagram giving merely comparative distances along straight lines representative of main and other roads.[1]

It is not at present known whether sea charts had been developed at this date, either as supplementary to or independent of the *peripli* or sailing directions. Nor is it possible as yet to trace the connection, if such exists, between the Greek cartography and that of the Syrians and Arabs, who in a measure succeeded the Greeks in scholarship and maritime adventure. Arabic maps and charts await study and research. In Europe, scientific cartography passed under a shadow with the decline of classical scholarship and learning, and the mediæval maps have a character of their own.

## COMPARATIVE DIAGRAM (FIG. 3).

In this diagram four old maps and globes have been redrawn for comparison with a modern map. All five maps are on Mercator's projection, and on the same scale. From the time of Ptolemy till the seventeenth century the world was supposed to be one-sixth smaller than it really is. Ptolemy's equator was about 20,700 miles, whereas the true equator is about 24,900 miles. In this diagram, therefore, the modern map is larger than the old maps.

In order to make comparisons clearer to the eye all the maps have been plotted in duplicate eastward and westward of the meridian of Ferro. In Behaim, for instance, travelling westward from the meridian of Ferro, the meridian of Japan is about 4,500 miles distant, corresponding roughly with the meridian of Cuba on a modern map. Whereas, travelling eastward Japan is 16,200 miles distant, corresponding roughly with the meridian of Alaska (150° west of Greenwich).

---

[1] See *Un extrait d'une carte romaine d'état-major. La Géographie,* January, 1925.

The four old maps selected for comparison are:—

(1) PTOLEMY (A.D. 140).—Ptolemy knew only a portion of the northern half of the eastern hemisphere. From the Hesperides to the confines of China he supposed to be half-way round the globe. The other half of the northern hemisphere and nearly the whole of the southern hemisphere were unknown to him.

(2) BEHAIM'S GLOBE (A.D. 1492) shows the Portuguese discoveries along the coast of Africa and the rounding of the Cape of Good Hope. China and Japan are from the tradition of Marco Polo and other travellers. The Indian Ocean is still mainly from Ptolemy. Of America (the lumbering double continent blocking the sea route to the East) Behaim was, of course, totally ignorant.

(3) MERCATOR'S GLOBE (A.D. 1541) shows America in fairly correct outline, but the north-west coast is omitted and its place assumed by the supposed North-West Sea Passage. Japan and China are pushed back westward towards their true positions. Terra Australis (imagined by the ancient world) surrounds the southern Pole.

(4) HONDIUS (A.D. 1611) shows North-West America reaching westward to about its true position, the meridian of Behring Straits; but the interior of America has become an unknown sea. Japan has overdone its westward movement and got well to the west of its true position. Terra Australis has increased, becoming the largest continent in the world.

## MEDIÆVAL MAPS.[1]

It is perhaps hardly realised, even by the student of geography, that so much of interest for the history of map-making is to be found in the middle ages. His historical enquiries will probably have led him back through the immense output of printed maps by the Dutch cartographers in the seventeenth century, to the lesser known work of the Italian school a hundred years earlier. If he has pursued his studies to the Ptolemaic revival of the fifteenth century he will have found himself carried back, in one gigantic step of

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[1] Contributed by Michael C. Andrews.

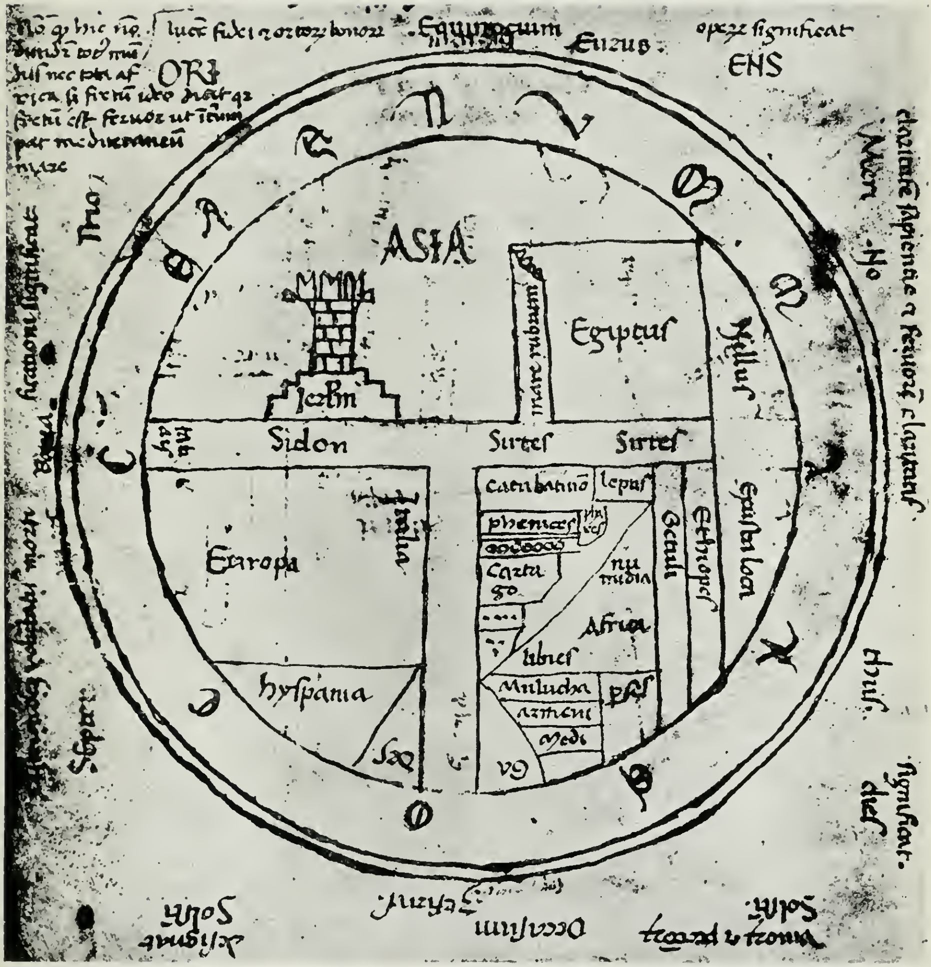

Fig. 2.

Œcumenical—Tripartite—T-O
Sallust-Bellum Jugurthinum
Milano, Biblioteca Ambrosiana, Cod. G. 21. sup.
Saec. XIII.

Size of original.

thirteen hundred years, to the Greek cartographer of Alexandria. For the history of cartography, from the fall of the Roman Empire in the West, until what may be called the renaissance of classical geography, has received but scant attention in the ordinary text-books. But, although scientific map-making suffered an almost total eclipse for many centuries, yet there were always students who interested themselves in the origin and constitution of the earth on which they lived, and it is as illustrations of the world schemes and theories of these enquirers that we generally find the mediæval mappæmundi.

In the Middle Ages, however, an examination of the origin of the world was largely the province of the theologian, while geography took a subordinate position as a branch of either geometrical or astrological science. Sometimes, indeed, geography degenerated into a subject with which to while away an hour of relaxation from more exacting studies, by the relation of stories about the marvels of the physical world, or legends of the monstrous races which were thought to inhabit its distant and unknown borders. To appreciate correctly the mediæval period of cartography, all modern conceptions of the objects and uses of maps must be put on one side. Mediæval maps seldom represented the best contemporary geographical knowledge; they were not intended for practical uses, for which they were entirely unfitted; neither were they constructed upon scientific or astronomical principles. Their object was not to represent the world as it really was, but to illustrate some scholar's philosophical conception of a theoretical universe, to exemplify the legends which formed a part of some historical work, or to indicate the traditions and dogmas of the Christian Church.

Illustrating, as they did, a nicely balanced and perfectly defined world, these maps frequently tended to become little more than symmetrically arranged symbols. Often of small size and copied in an inaccurate and barbarous manner by unintelligent scribes, they have frequently been overlooked by the learned editors of the texts in which they remain unrecorded and hidden from all but a close and laborious detailed search.

Mediæval mappæmundi may be divided into two main families. One is based upon a simple conception common to the earliest geographical enquiries of most ancient peoples, according to which the earth is regarded as a small inhabited flat disc surrounded by the " river of ocean." In the smaller and more diagrammatic examples of this type, which are usually placed with the East at the top, a tripartite division into the three continents of the ancient world is often effected by a "T" placed within an "O." Sometimes these T-O maps also indicate the partition of the world among the three sons of Noah; and after the time of the Crusades it is not unusual to find Jerusalem occupying the middle point. Adopted by the early Fathers of the Church, from Greek or Hebrew sources, this elementary picture of the *oikumene* fitted in so well with the biblical scheme of geography that it was naturally and freely adopted by mediæval monastic scribes, even long after the sphericity of the earth had been accepted by the majority of thinkers. (See figs. 1 and 2.)

The second group illustrates the pre-Christian mathematical conception, which fully accepted this sphericity, but they indicate only one hemisphere. In these the globe was often divided by two encircling oceans at right angles to one another, into four equal land masses of which only one was inhabited by the human race, the austral continent being assigned to the fabulous Antipodes. It is somewhat surprising that such an essentially anti-biblical portrayal of the world, introduced into Western Europe by a study of the writings of Macrobius and Martianus Capella, was equally popular with that which conformed with the requirements of the Church. In maps of this type the hemisphere was also commonly traversed by five zones, temperate, torrid, and frigid; but in those examples which were influenced by Arabic ideas the *oikumene* was divided into the seven climates of the Greek geographers. Climate sketches are, however, neither numerous nor elaborate, while judging from their known maps the Moslem philosophers were far from reaching that excellence in cartographical representation which might have been anticipated from their elaborate treatment of regional geography. (See figs. 4 and 5.)

Falling chronologically within the mediæval period of cartography is another, but completely different class of map. The type just considered was evidently quite useless to the sailors who were rapidly extending the commerce and sea power of the Italian maritime republics. The navigator required a chart which would indicate the course he must steer from one port to another, and which would at the same time give him some indication of the coasts he must pass, and the distances he must traverse. This demand for practical information was met by those nautical charts which are usually called "portolan charts." Little is known of their origin, but it is probable they were constructed to supplement the written books of sailing directions—the *portolani*. (See fig. 6.) Some investigators have supposed that the complete form as we now know it was attained in the last half of the thirteenth century, by assembling earlier partial coastal sketches. Others have seen in it indications of a more remote ancestry, suggesting a Byzantine influence. It has even been suggested that it may be ultimately traced to such early, but now lost, sea charts as those of Marinus of Tyre, which were studied by Claudius Ptolemy.

It is, however, certain that the earliest charts, dating from the late thirteenth or early fourteenth century, present a remarkable accuracy in general proportion, completeness of detail and wealth of place names, which is in sharp contrast with the mediæval mappæmundi of the same age. Constructed for the use of the mariners of Southern Europe, their scope was in general restricted to the Mediterranean Basin, with a varying extent of the Atlantic coast-line of Europe and Africa, which, however, was presented with less accuracy and less fixity of form. Only those features which were of practical use in navigation were indicated. Coast-lines, with their bays and headlands, islands and shoals, seaports and harbours, were the main concern of their designers, who troubled themselves but little to record any internal physical features. Inland cities were occasionally represented in a form more ornamental than useful, by large coloured drawings of churches, castles and town walls; while banners emblazoned with appropriate heraldic devices or richly decorated pavilions indicated countries whose political boundaries were left undefined.

In their conception of the practical utility of the map for certain specific purposes, the outlook of the mediæval Catalan and Italian cartographers was essentially modern. But they did not employ modern constructional methods, neither were they influenced by Ptolemaic or other scientific ideas. Latitudes and longitudes found no part in their scheme. Instead, they covered their charts with a network of rhumb lines, radiating from a series of symmetrically distributed points and crossing one another in all directions. (See fig. 7.) The origin of this elaborate and carefully executed system may be supposed to date from a period in the early stages of development of the mariner's compass before a card of the winds was attached to the magnetic needle, and when it, therefore, might have been of practical utility to the pilot. But it is not easy to understand why the network was so long retained. That it was not used for constructional purposes is evident from the fact that the compass lines do not occupy the same position relatively to the coast-lines in any two charts; even those by the same hand, and practically identical in other respects, differ in this particular. It may be that the custom which was general in the sixteenth century, of decorating the crossing points with elaborately illuminated wind roses, deterred the draughtsman from removing with the rhumb lines one of his chief opportunities of ornamentation. But the universal retention of the system was most probably due to the conservative character of the seamen for whom the charts were prepared.

In the long series of portolan charts which were produced for over three centuries, there is little change, except in detail, in the delineation of the Mediterranean and Black Seas, the earlier examples being copied with considerable fidelity. Outside the Straits of Gibraltar, however, the western seaboard of Europe continued to be developed until the end of the sixteenth century. In the work of the late fifteenth century may be traced the progressive discoveries of the Portuguese along the west coast of Africa, until, rounding its southern point, they entered the Indian Ocean, and sounded the death knell of Venetian commercial supremacy. A few years later the discovery of America was duly recorded, and the passage of European navigators across the Pacific Ocean provided sufficient material to transform the portolan chart into a true world map inevitably accompanied by the difficulties of projection.

## THE AGE OF DISCOVERY.[1]

### I.—*The Period* A.D. *1492—1541.*

"THE AGE OF DISCOVERY" is a grand general expression which (like the "Renaissance" and the "Ancient World")

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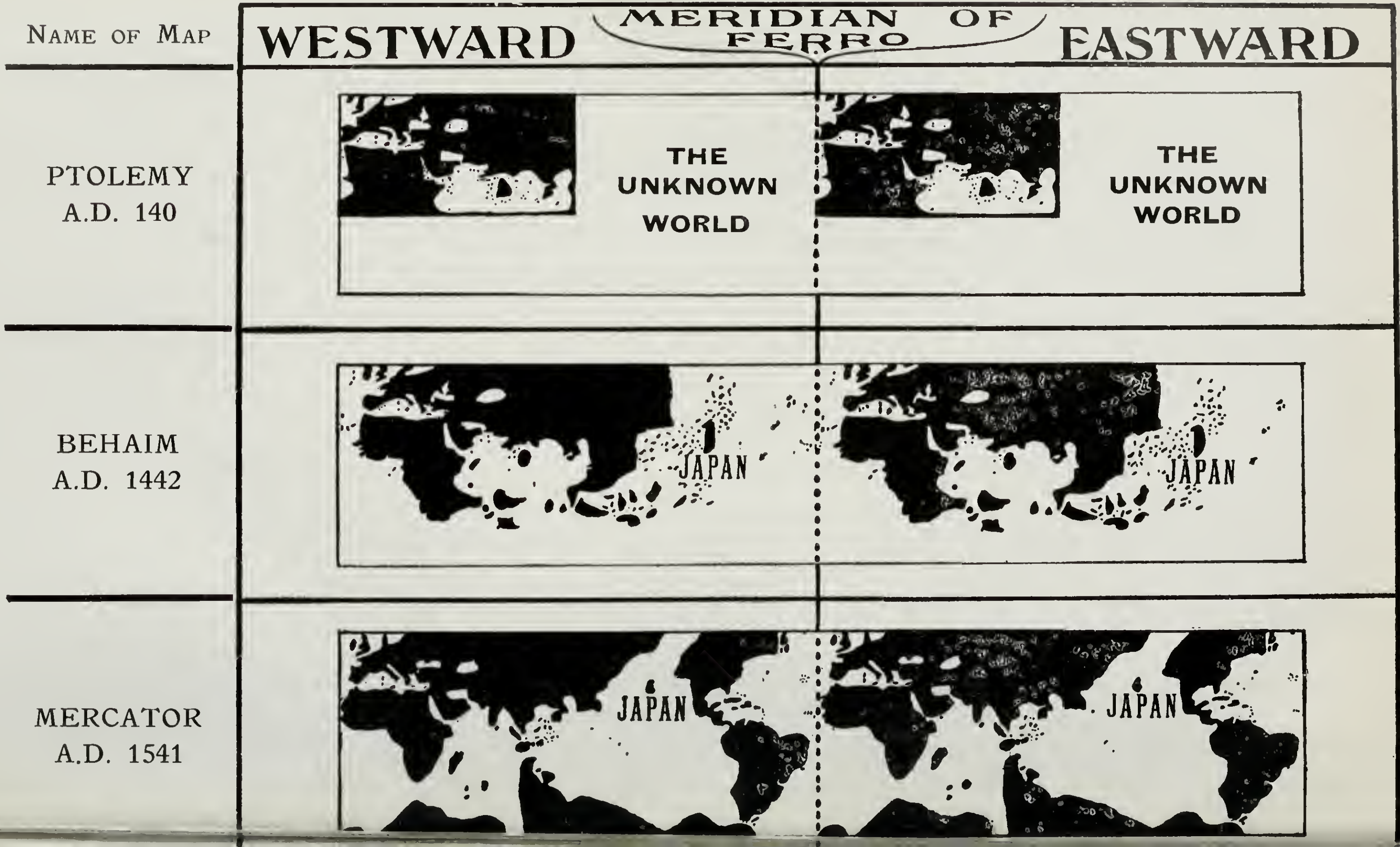
[1] Contributed by Colonel Dudley Mills.

# COMPARATIVE DIAGRAM OF WORLD MAPS



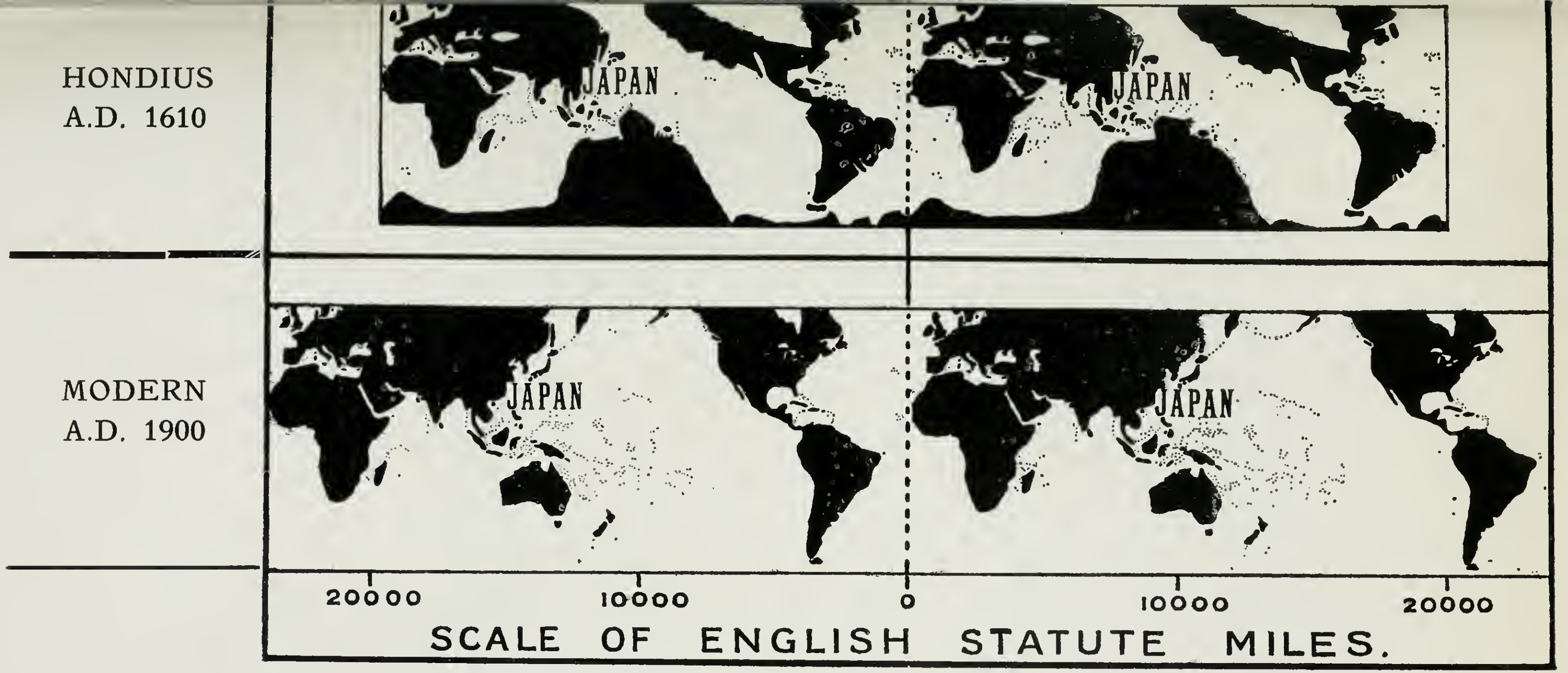


Table of distances in miles measured along the equator between the meridians of Ferro and Japan in the undermentioned maps.

| Direction | Behaim | Mercator | Hondius | Modern |
|---|---|---|---|---|
| Westward | 4,700 | 8,200 | 11,300 | 14,100 |
| Eastward | 16,000 | 13,500 | 9,400 | 10,800 |
| Total | 20.700 | 20,700 | 20,700 | 24,900 |

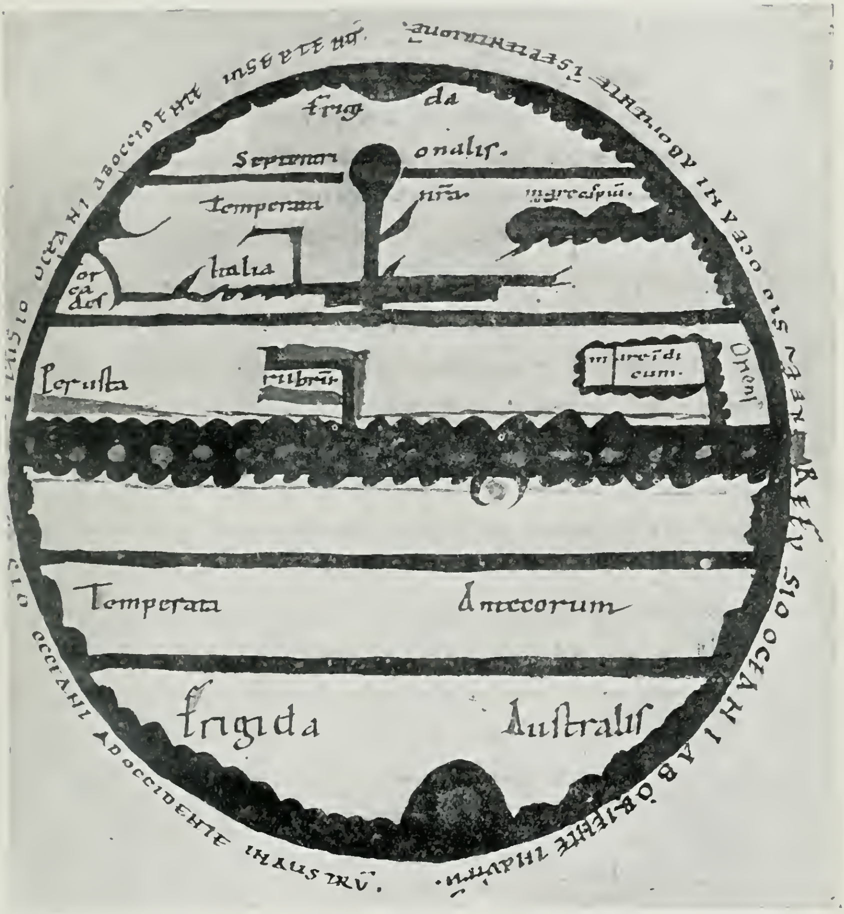

Sinus oceani ab occidente in septentrionem.
Sinus oceani ab oriente in septentrionem.
Frig da
Septentri onalis.
Temperata
nra
mare caspium.
orcades
Italia
Perusta
rubrum
mare indicum.
Oriens
Temperata
Antecorum
Frigida
Australis
Sinus oceani ab occidente in austrum.
Sinus oceani ab oriente in austrum.

Fig. 4.

Hemispherical—Oceanic—Zone.
Macrobius, Commentarius in Somnium Scipionis.
Firenze, R Biblioteca Medicea-Laurenziana, Cod. Plut. 76.33.
Saec. XII.

Size of original.

can be stretched or compressed to suit the special needs of special students. Four centuries before Columbus the Crusades (in themselves bad) gave a good impetus to travel and discovery. Their final failure, with the fall of Acre in 1291, was still more effective. That same year saw the first recorded maritime expedition along the west coast of Africa since Hanno, c. 470 B.C. Moslem land supremacy in the East was the precursor in the West of maritime exploration past the Pillars of Hercules into the unknown " Ocean Sea." The year 1291 is convenient, therefore, as marking the commencement of the geographical renaissance.

Two more centuries passed before Columbus (an Italian then in Spanish service), in March, 1493, put into Lisbon, owing to stress of weather, on return from his first voyage to the New World. During the fifteenth century, maritime exploration into the Atlantic and along the coast of Africa had been carried on mainly by the Portuguese, who looked on the unknown world as a Portuguese perquisite. The sudden appearance of Columbus (himself an ex-service man of Portugal) caused quite a flutter in the financial and diplomatic circles of Lisbon. Some extremists proposed to settle the matter offhand by killing Columbus as a traitor. Wiser counsels prevailed and a diplomatic mission was sent to Rome. There, in May, 1493, it met a Spanish Mission on the same errand, and a Papal Bull was issued dividing the unknown world between the rival Powers. In 1494 a treaty was signed defining the line of division by a meridian of longitude 270 leagues west of the Cape Verde Islands (equivalent to 45° west of Greenwich). Spain was to own all lands west of that line, Portugal to retain all existing possessions and own all new discoveries east of the line.

Discovery proceeded according to plan. The Portuguese reached India in 1498, Malacca in 1509, the Moluccas in 1512, China in 1517. The Spanish explored the West Indies during the four voyages of Columbus, 1492—1504, reached the Pacific in 1513, and conquered Mexico in 1519.

In 1519 Magellan (a Portuguese in Spanish employ) started from Spain on a voyage round the world westward. Magellan himself was killed in the Philippines in 1521, but the survivors of the expedition came back safely to Spain in 1522, doing penance in Seville Cathedral for " having somehow mysteriously lost a day and kept their feasts and fasts all wrong.''

In 1527 the first Spanish expedition crossed the Pacific from Mexico to the Moluccas.

In 1529 Spain and Portugal defined their respective spheres of influence in the Far East by a meridian 17° east of the Moluccas.

In 1531 Pizarro conquered Peru, and in 1535 Diego conquered Chile.

Outside the Hispanic combine there was very little left for other nations to do, but there were three noteworthy expeditions :—

(1) In 1497 Cabot, an Italian whose origin and end are alike obscure, sailed in British employ from Bristol to North America and back. In 1498 he sailed again. There is some doubt whether he ever returned. The subject is highly controversial.

(2) In 1524 Verrazano, an Italian in French employ, explored the coast of North America.

(3) In 1534 Jaques Cartier discovered Canada, making his first voyage up the gulf of the St. Lawrence.

The Italians were great seamen and explorers, but Italy itself was only ''a geographical expression'' till the nineteenth century.

The year 1541 is an arbitrary but convenient date for the end of the ''Great Age of Discovery.'' A comparison of the globe made in that year by Mercator with the globe of Behaim in 1492 gives cartographic precision to discovery during the 50 years.

In 1492 Copernicus was 19 years old, Luther seven, and Henry VIII. an infant in arms. All three were still alive in 1541 and must have known generally of the discovery recorded on Mercator's globe.

After 1541 discovery continued, but at a slower pace, and has never quite stopped. At the beginning of the seventeenth century Australasia was still entirely unknown. The north Pacific had to wait till the eighteenth, the interior of Africa till the nineteenth, and it was not till the twentieth that the Poles were at last exposed to human view.

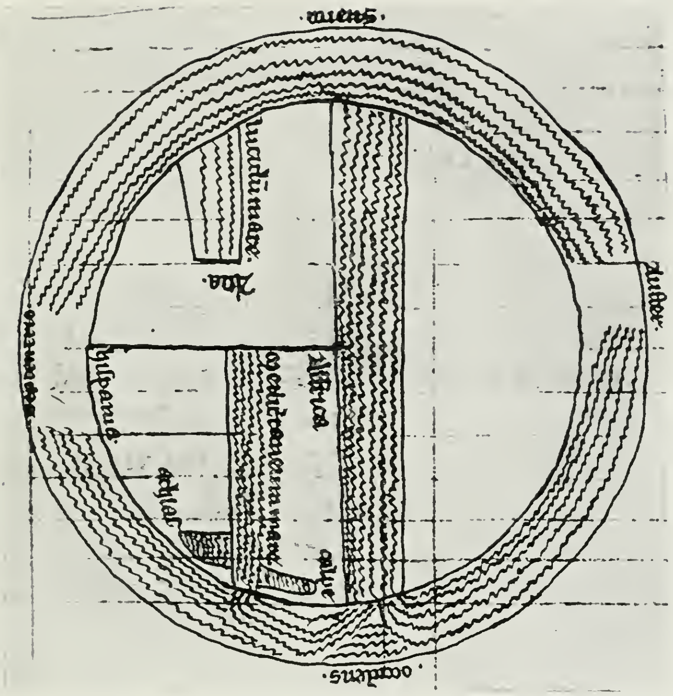


Fig. 5.

Hemispherical—Oceanic
William of Conches.—Philosophia.
Cambridge, St. John's College, Cod. No. G 3.
Saec. XIII

Size of original.

### II.—*The Significance of the Period.*

The significance of the "Age of Discovery" is well described in a passage from "The Holy Roman Empire," written by Lord Bryce in 1865 :—

"That time—a time of change and movement in every part of human life, a time when printing had become common and books were no longer confined to the clergy, when drilled troops were replacing the feudal militia, when the use of gunpowder was changing the face of war—was especially marked by one event, to which the history of the world offers no parallel before or since—the discovery of America.

The cloud which from the beginning of things had hung thick and dark round the borders of civilisation was suddenly lifted; the feeling of mysterious awe with which men had regarded the firm plain of earth and her encircling ocean ever since the days of Homer, vanished when astronomers and geographers taught them that she was an insignificant globe, who, so far from being the centre of the universe, was herself swept round in the motion of one of the least of its countless systems. The notions that had hitherto prevailed regarding the life of man and his relations to Nature and the supernatural, were rudely shaken by the knowledge that was soon gained of tribes in every stage of culture and living under every variety of condition, who had developed apart from all the influences of the Eastern hemisphere. In A.D. 1453 the capture of Constantinople and extinction of the Eastern Empire had dealt a fatal blow to the prestige of tradition and an immemorial name; in A.D. 1492 there was disclosed a world whither the eagles of all-conquering Rome had never winged their flight. No one could now have repeated the arguments of the De Monarchia."

Dante (1265—1321) and Marco Polo (1254—1324) were contemporaries in Italy for over 20 years, but neither knew anything of the other. The arguments of De Monarchia lapsed, though Dante's musical metaphysical language still charms the world. But Marco Polo, by his travels, his good memory, and his conversational powers, became, we can now see, an important factor in geographical discovery.

## III.—*The Maps of the Period.*

| Date. | Public. | GOVERNMENT. | | |
|---|---|---|---|---|
| | | Portuguese. | Spanish. | French. |
| 1492 | 18. Behaim's Globe. | | | |
| 1493 | | 19. (Laon Globe). | | |
| 1500 | | | 20. Juan de la Cosa. | |
| 1502 | | 21. Canerio.<br>22. Cantino. | | |
| 1503 | | 23. Munich. | | |
| 1504 | | 24. Pilestrina. | | |
| 1507 | 25.<br>26. } Waldseemüller. | | | |
| 1508 | 27. Ruysch. | | | |
| 1509 | | 26. (*a*)(Lenox Globe). | | |
| 1515 | 28. Schöner Globe. | | | |
| 1516 | 29. Waldseemüller. | | | |
| 1519 | | 31. Munich. | 30. Maiollo. | |
| 1523 | 33. 'Holbein' Globe. | | 32. Turin. | |
| 1526 | | | 34. Salviati. | |
| 1527 | | | 35. Wolfenbüttel.<br>37. Weimar. | 36. Maiollo. |
| 1529 | | | 38.<br>39. } Ribero. | 40. Verrazano. |
| 1533 | 41. Schöner Globe. | | | |
| 1537 | | | | 44. Desceliers. |
| 1541 | 42. Mercator Globe. | | | |

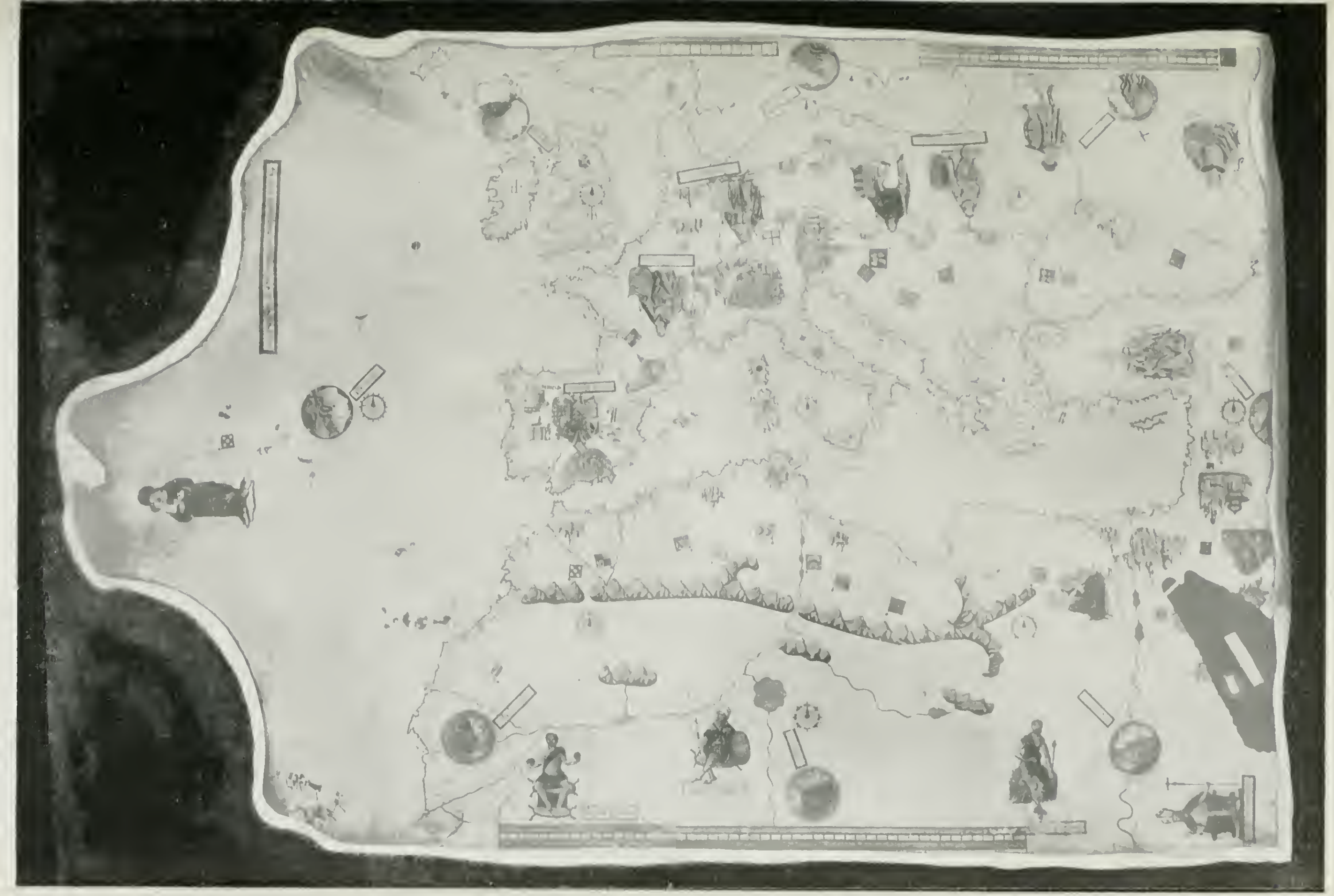


Fig. 6. Portolan Chart.

Salvat de Pilestrina of Majorca, 1511. München Armeebibliothek. Scale about 1/6.

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This table sets out the 27 maps given in the catalogue belonging to the 50 years 1492—1541. (They form but a small proportion of the total number of known maps of the period.) These maps may be divided into two groups: one containing those constructed by cartographers from all available sources and issued for *public* use, the other comprising those embodying official information and kept as secret documents by the various *Governments* for which they were constructed.

The maps by Waldseemüller, Schöner and Mercator were all engraved and published in the lifetimes of their authors. The original of Behaim is still extant, the most unique geographic object in the world. Waldseemüller's maps were lost and not re-discovered till the twentieth century. Ruysch was published in the printed Ptolemy, Rome, 1508.

The other maps, from Spanish, Portuguese and French sources, were secret Government manuscript maps. Juan de la Cosa and Ribero (1529) and Desceliers (1539, 1546, 1550) were reproduced in the nineteenth century. The Laon Globe was unknown until 1860. The remainder were not reproduced in full until E. L. Stevenson succeeded in obtaining photographic reproductions in the twentieth century.

Spain, Portugal and France were rivals in discovery and naturally wished to keep all useful information to themselves. Towards the close of the sixteenth century there arose an increased demand for geographical knowledge, and atlases were published to meet the public demand. The original secret manuscript maps became obsolete and were forgotten till the nineteenth century, when a few historical students began slowly to realise the historical importance of old maps.

With the development of maps and atlases and the beginnings of surveys in Britain and the Continent we enter a new epoch of cartography, that of the modern map.

## Modern Maps.[1]

The map lies in classification between the picture and the book. Although its most pronounced feature is pictorial, the written element of explanation is almost an essential, and, indeed, a map drawn to-day without a vast amount of writing, or printing, on its surface would be regarded almost as an imbecility, and, except in some special and highly technical examples, could have no practical value.

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[1] Abstracted from lecture given at the Exhibition by Sir George Fordham and published by the University Press, 1/-.

The map is naturally more ancient than the book. The pictorial effort of human intellectual development, which speaks directly to one of the senses, precedes the conception of a sign, or series of graphic signs, which involves an act of memory and of reasoning to give them meaning.

British cartography cannot be studied apart from the cartographic output of Central Europe in its earlier stages, and of the world in general to-day. Cartography is a truly cosmopolitan science. We have now attained to a uniformity in mapping which results from the common application of the rules of science and art in the construction of all maps. Thus there are now no special, or exclusive, schools such as are well defined in any historical review of maps and their production. And, as regards British cartography, it cannot be said that at any time there was any specially characteristic art, or science developed such as would mark out for distinction a British school.

Nevertheless, we have produced at different periods notable workers, and they have left behind them satisfactory records of the progress they have achieved.

We have not anything in these islands to compare quite with the great Dutch and Flemish schools founded on the work of Ortelius and Mercator which flourished for about a century from 1570 onwards, nor with the important French school of Nicolas Sanson and his successors which filled the century which follows. Nor again, can we establish any parallel amongst us at a later period with the magnificent constructive work of 40 years of the Cassinis in their triangulation of France and the preparation of their great maps of that country.

We have, however, done our part here.

It is to be noted that so soon as Cartography became a wide-spread science the construction of provincial maps grew into popularity, and that from these maps, as was natural, the maps of kingdoms and national areas were built up in an exact delineation.

So, in England and in Wales the counties, as in the Low Countries and in France the provinces, became the prolific basis of cartographical progress. Thus the historical study

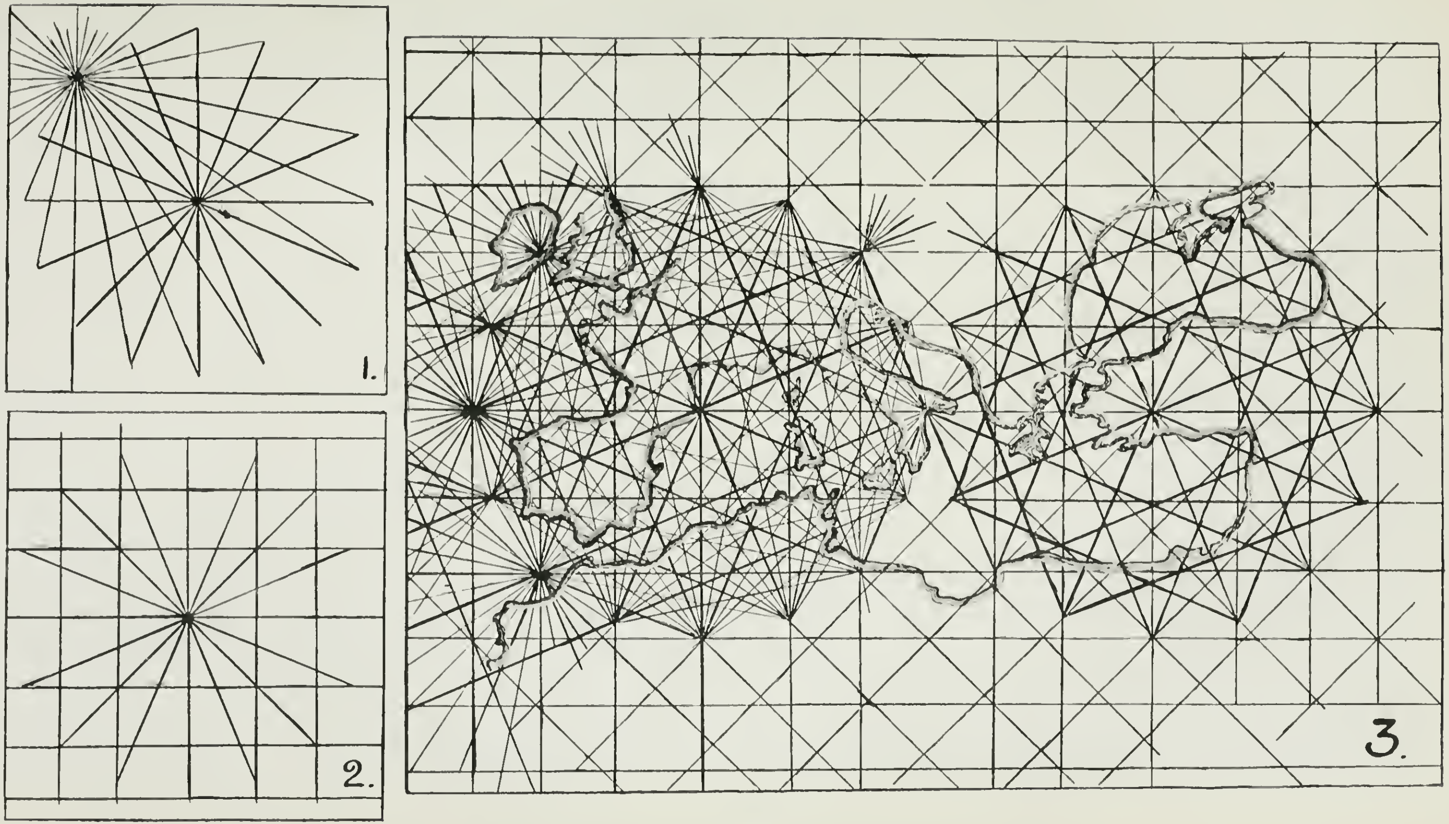

Fig. 7. The development of the loxodromes on a Portolan Chart.

of maps in Central Europe, and their technical study also, may be most usefully concentrated on provincial maps.

This is a sound proposition, because cartographers of whatever nation who attempted general maps drew at all times on world-knowledge in which their individuality merged, while at home, working from original information, they developed personal and national characteristics in art and method.

Christopher Saxton published in 1579 his collection of 35 maps engraved in various years from 1574 to 1578 and based upon his own survey of England and Wales. No similar work had previously been done for any country in Europe. In France it was not until 1594 that a small collection of maps of the French provinces was published, printed at Tours by Maurice Bouguereau.

Christopher Saxton was a pioneer. His project, his labours, his success meant a new departure, a real constructive step forward. To Saxton succeeded John Norden, who planned a survey of all the counties of England. His maps are distinguished by the insertion of the highways, whereas Saxton only showed the bridges. He was the author and inventor of the well-known triangular tables of distances.

John Speed is the striking figure in the earlier part of the seventeenth century, and his county maps, with those engraved by Kip and Hole for the 1607 edition of Camden's *Britannia*, held the field until about 1676, when a new school of cartography was founded by John Seller and his co-workers and contemporaries.

Towards the end of the seventeenth century a marked and important step must be recorded. John Ogilby measured the postal roads, on the basis of the statute mile of 1,760 yards, which displaced the old British mile, previously the measure of distance throughout the country generally. He published his *Britannia*, a folio volume of road maps, in 1675, thus laying the foundation for a long and interesting series of road books and itineraries.

In the following year John Seller published a map of Hertfordshire with the roads and other details considerably elaborated and drawn on the meridian of London instead of the old Western meridian of the Ptolemaic dispensation which had been in general use up to that time.

In France the publication of Nicolas Sanson's atlas, *Cartes*

*Générales de toutes les Parties due Monde,* in 1658, may be taken as marking a similar point of progress. His predecessors were, as publishers and engravers, Maurice Bouguereau, Gabriel Tavernier, Jean Le Clerc, Melchior Tavernier, Jean Boisseau, and Pierre Mariette.

Sanson founded a school of which the successive developments extend to a century, through his sons Adrien and Guillaume, the Jaillots (Alexis Hubert, and his sons and grandsons), and their successors, the two Robert de Vaugondy. They produced a remarkable series of beautiful and highly ornamental and decorative maps, including a large number of maps of the provinces of France. Really exact cartography and reduction of the meridian of the Isle de Fer, fixed by Richelieu, to that of Paris must, however, be attributed probably to the elder de Lisle at the beginning of the eighteenth century, who was followed by other well-known cartographers.

The next development takes two forms and may be dated from about 1760.

The general and county atlases of Thomas Kitchin and the two Bowens are perhaps the least interesting of the two, though they are important.

A real departure from tradition was that produced by the large-scale maps of individual counties, undertaken on the basis of subscriptions providing a fund sufficient to meet in advance the cost of actual survey and of the expensive engraving in much detail of surface representation, and encouraged by premiums offered by the Royal Society of Arts. These maps were produced in the more wealthy and residential counties only. A fine series is to be found in the John Rylands Library.

This is a remarkable development, and has no exact parallel in the world. The student of historical cartography in this country would do well to make a careful examination of some typical examples of the series.

In France the general progress in cartographical science was marked by the production of the immense map of France drawn upon a complete triangulation of that country, the work extending over 45 years (and half a century in advance of our own Ordnance Survey), of the two Cassinis, father and son. The Cassinis laid the real foundation of modern and exact cartography. No student can pretend to any knowledge of his subject until he has examined the work of the Cassinis in its methods, its details, and its results. Its study illuminates the path of the cartographer. It anticipates the world map on the scale of one-millionth now in course of construction. The ideas of the elder Cassini extended, at all events, to the preparation of an exact map of Europe on the same scale, based on a complete triangulation of the whole surface of the earth.

War has been the most prolific source of progress in Cartography. While the British Ordnance Survey traces its origin to the military operations in the Highlands of Scotland connected with the rebellion of 1745, the initiative of the Cassinian surveys may be found in the long-continued wars waged in Central Europe, and particularly in Flanders, in the eighteenth century.

The Ordnance Survey period of exact and methodical cartography in Great Britain which characterises the last century and a quarter lies outside this article, and reference only can be made to the most distinguished of British cartographers, John Cary. His output of maps, atlases, and other publications covers a period of, roughly, half a century (about 1780 to 1830), and the execution of his work makes him one of the finest exponents of British art and science as applied to maps.

# THE EXPLORATION OF ANTARCTICA.

By Rev. J. GORDON HAYES, M.A. (Cantab.).

(Delivered to the Society, October 12th, 1923.)

## INTRODUCTION.

THERE are at least two different methods of dealing with such a subject as that of the exploration of Antarctica. Perhaps we may term them the scientific and the artistic methods. The scientific method is preferable on account of its comprehensiveness and accuracy, but it has the disadvantage of being long. When time forbids such a full treatment of a subject recourse may be had to the other method. By a kind of impressionist style greater freedom of treatment is secured, while perfectly correct conceptions may be conveyed provided that the result attained is a sketch and not a caricature.

The exploration of the earth's last continent is a vast subject, the origin of which would take us back to the Ancient Greeks, who, by purely inductive reasoning, believed that an unknown world existed around the southern Pole. The scientific method would lead us through the whole course of historical geography up to the present time; but "impressionist treatment" may enable us to deal with the vital parts of the subject in the short time at our disposal, summarising historical portions which cannot be altogether omitted, and concentrating our attention upon the *present* and *future* aspects of the matter. It will be necessary to consider the geographical problems which await solution, and some suggestions will be made for completing the exploration of this continent. It will conduce to a clearer understanding if we begin with a glance at the more important physical features of Antarctica.

## I.—THE KNOWN.

### (*a*) *Physical Features.*[1]

The most characteristic feature of Antarctica is its dissimilarity to any other continent. Its geographical and glaciological conditions are absolutely unique. It occupies a position of splendid isolation from the rest of the world.

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[1] See Chart No. 6.

Having been the only continent that was inaccessible to primitive man it is the only continent that has never been inhabited. It is unique in being a circumpolar continent surrounded by oceans, the relative positions of land and water being exactly the reverse of their disposition in the Arctic Regions, where a circumpolar ocean is surrounded by continents. The area of Antarctica is computed by Sir Douglas Mawson to be equal to the combined areas of Europe and Australia, but its magnitude cannot be appreciated unless its average height is also considered. In this, again, it is unique, with a mean elevation estimated by the writer at about 7,000 feet, or more than double that of Asia, the next highest of the continents. It is unique, as a continent, in its meteorological conditions, the effect of which, in conjunction with its great elevation and geographical position, has been, in recent geological ages, to almost completely glacierise it. Hence it is unique in being the only continent at present in its ice age. The atmospheric and geological conditions must be passed over here, but the glaciological features are of the first importance.

Antarctica is unique, once more, in being the only country in the world where *all* the different forms of ice are to be found. Some ice formations, such as shelf-ice, exist nowhere else, and other forms occur here in their greatest development. The whole of the glacierisation is on the most stupendous scale, the only country which can be compared with Antarctica in this respect being Greenland, which is not more than one-sixth its size.

The *Continental Ice-sheet,* which covers the whole interior, is absolutely the greatest mass of ice in existence. Its area is about five million square miles, or one million miles more than the whole of Europe. It has buried all the land except the highest mountains, and these are heavily glacierised. It is the mighty gathering-ground and storage reservoir of nearly all the other ice-formations. It moves down to the sea as a huge extended glacier along, probably, the greater part of the coast, forming in depressions, as it also does through mountain valleys, more specific, and true valley, glaciers. The ice-sheet as a whole, with the important exception of the glaciers, acts as a protective covering for the land beneath. This tremendous dome of the south-polar ice-cap is the greatest desert in the world.

From this it follows that the largest known *glaciers* will be found here, as seen in the list:—

| | Length. | Width. | | |
|---|---|---|---|---|
| Name of glacier. | Miles. | | Discoverer. | Notes. |
| Dawson Lambton | Unknown | 40 | Shackleton. | Caird Coast. |
| Allan McDonald | ,, | 25 | ,, | ,, |
| Mill | ,, | 15 | ,, | Dominion Range. |
| Beardmore | 130 | 20 | ,, | Length to Shackleton icefalls. |
| Ninnis, K. George L. | 130 | 30 | Mawson. | Floating tongue, 80 miles of this. |
| Mertz, ditto | 95 | 25 | ,, | Floating tongue, 55 miles of this. |
| Denman | Over 60 | 10 | ,, | Queen Mary Land. |
| Ferrar | 60 | 7 | Scott. | Fall, 9,000 feet. |
| David-Drygalski | 60 | 8 | ,, | Floating tongue, 30 miles of this. |

Largest in Greenland about 60 miles long.
Siachen, in Karakoram Mts., 45 miles long, 3 miles wide.
Seward, Alaska, about 40 miles long.

*Shelf-ice* is by far the greatest form assumed by floating ice, and is found only in Antarctica. The term "barrier" for this ice-formation is now obsolescent and should be restricted to the name of the Ross Barrier.[1] The term "Shelf-ice," bestowed by Nordenskjöld, is doubly appropriate, indicating at once its shape, and its position which is normally over the edge of the continental shelf. It is partly composed of the snow that falls on its surface and partly of the continental ice which pours down the slopes and glaciers. The following list shows the number of these formations at present known, but none of them has been completely explored.

| Name. | Coast. | Discoverer. | Size.—Miles. |
|---|---|---|---|
| Ross Barrier. | Victoria & K. Edward Lds. | Ross. | About 600 by 300. |
| Shackleton Shelf. | Q. Mary L. | Mawson. | ,, 170 by 150. |
| (In Lady Newnes Bay). | | Scott. | ,, 60 by 50. |
| Wilhelm Barrier. | Leopold Ld. | Filchner. | ,, 180 in length. |
| Nordenskjöld Barrier. | Graham Ld. | Nordenskjöld. | ,, 150 ,, |
| (?) "Bruce Barrier. | Coats Ld. | Bruce. | ,, 100 ,, |
| (?) "Scott" Barrier. | K. Edward Ld. | Scott. | ,, 60 to 100 in length. |

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[1] Shown on Chart No. 1.

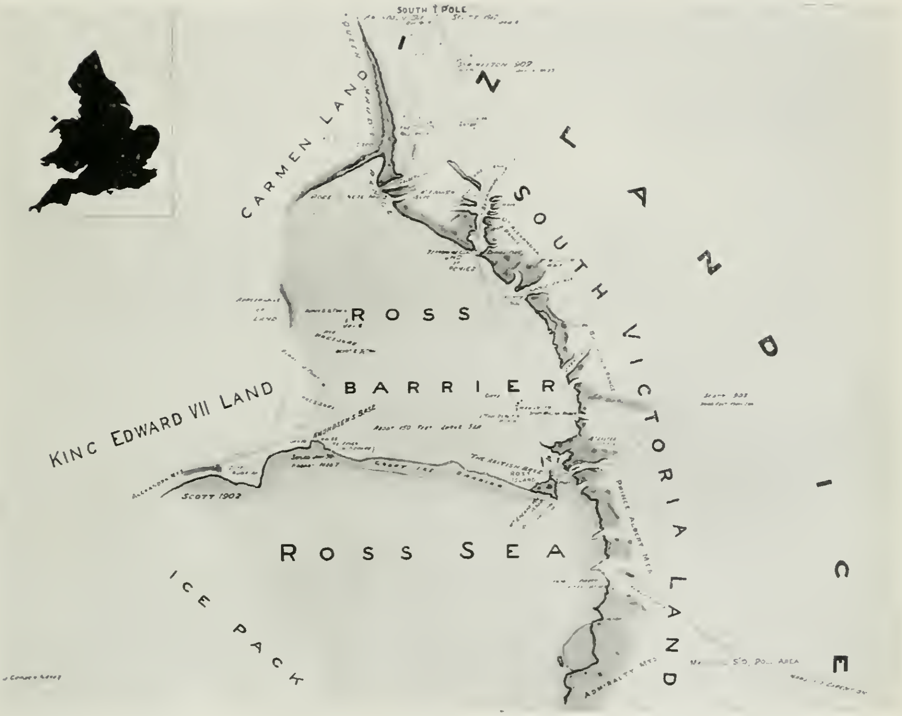

Fig. 1. (208) The Ross Dependency.

Sir Ernest Shackleton said that the Caird Coast, also, was fronted by an undulating barrier. But we must be content at present with this glance at the more important physical features; others will be touched upon later.

(*b*) *Recent Exploration.*[1]

It is obviously impossible, in the time at our disposal, to deal with all the expeditions that have explored Antarctica, even in recent years, but it is with much regret that the excellent work done by de Gerlache and Charcot, Nordenskjöld and Filchner is dismissed with no more than a passing reference. Such are the disadvantages of "impressionist" sketches.

We have the consolation, however, that about 85 per cent. of the land now charted was discovered by five great explorers, of whom four have been British. They are Admiral Sir J. C. Ross, Captain Scott, Sir Ernest Shackleton, Sir Douglas Mawson and Captain Amundsen. We shall not miss very much, therefore, if we restrict our attention to the work of these explorers, and may even go further and eliminate Ross. For although he discovered about 1,000 miles of Antarctica, the recent great era of exploration did not begin until Scott's first expedition in 1902, since when most of the new land has been charted.

The coastline of South Victoria Land was practically unknown when Scott went out, for Ross had seen it only from a considerable distance. Scott examined and charted 250 miles of this coast, from Coulman Island to MacMurdo Sound, discovering some shelf-ice and two floating ice-tongues, the Royal Society Mountains, the insularity of Ross Island, and King Edward the Seventh Land. He threw much light upon the Ross Barrier, and on his great southern journey with Shackleton and Wilson discovered and charted its western coast, which he found to consist of a fine mountain range, for a distance of 350 miles. Lieut. Armitage discovered the Ferrar Glacier, and the plateau from which it emanated; and Scott further explored both, on a splendid journey of about 300 miles to the west. About 1,000 miles of new land was charted by this expedition.

Shackleton's first expedition was a great advance on that of Scott. The first ascent of Mt. Erebus was made, Professor

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[1] See Charts 1 and 6.

David and Dr. Mawson reached the Magnetic Polar Area, Mr. R. E. Priestley made a geological survey of the Ferrar Glacier district, and Shackleton's party accomplished the most brilliant polar journey ever made. In the course of this fine march Shackleton discovered the largest valley glacier in the world, the south polar plateau, 10,000 feet high, and about 600 miles of new mountain ranges including the south coast of the Ross Barrier. The total amount of land charted by the whole expedition was about 1,200 miles, and so completely had the work been done that hardly anything was left, in this part of Antarctica, for future accomplishment. Geographically there was only the attainment of the Pole, which could add nothing to our knowledge beyond another 100 miles of continental ice. Intensive scientific work can always, and everywhere, be done with advantage, but Shackleton had closed the history of the exploration of Antarctica, in its main features, as attainable from MacMurdo Sound.

Captain Amundsen made the finest polar dash on record, travelling 1,860 miles[1] at an average rate of 23 miles a march. He made more discoveries than any other single expedition up to that time, and which have only been exceeded since by the Australasian Antarctic expedition. This result was achieved by, very properly, striking out upon a new route for the entire distance. The Norwegians' total appears to have been about 1,300 miles of new land, but very little of this was explored. Their new route across the Barrier, about 450 miles long, is additional to this.

It seems rather a portentous coincidence that, whereas the first expeditions of both Scott and Shackleton were brilliantly successful, disaster should dog the steps of their second ventures almost from the start. We rightly worship both these heroes, but reason must assert itself in considering their achievements. Scott's last expedition was the third of its kind to make its base in MacMurdo Sound, hence, beyond the attainment of the South Pole, for which those noble lives were laid down, very little geographical work could be done. Lieut. Pennell discovered Oates Land, and the Northern and Western parties each opened up about 50 miles of new mountains and glaciers, making a total of about 300 miles for the whole expedition. Excellent scientific work was done in other

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[1] "The South Pole," vol. ii, p. 174.

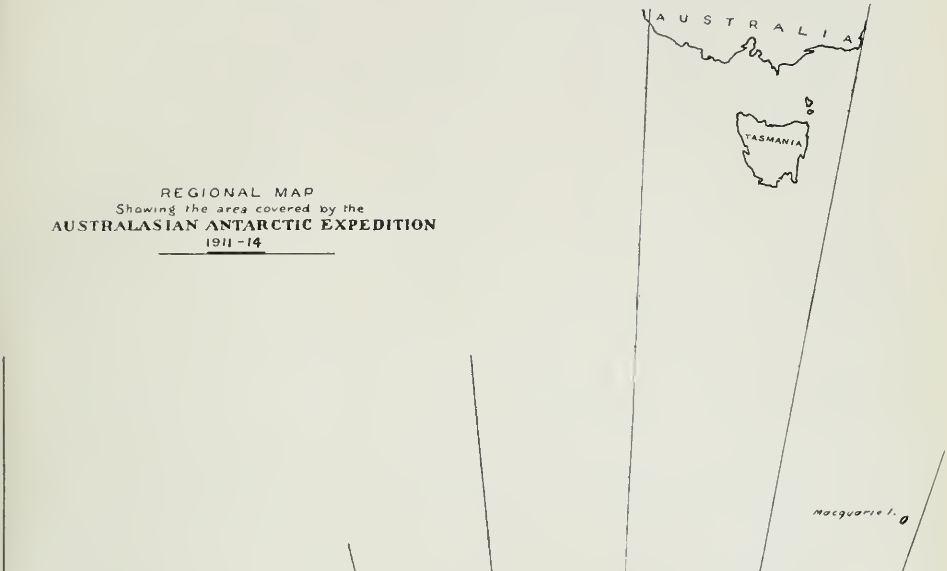

Fig. 2. (210) Mawson's Australian expedition.

directions, in continuation of that already so well begun there, but it would have been much more valuable in one of the many unexplored parts of Antarctica.

Sir Douglas Mawson's expedition,[1] judged by the magnitude of its scale and that of its achievements, was the greatest and the most consummate expedition that ever sailed to the Antarctic. It consisted of the following divisions, each of which would have formed in itself an important expedition. First, the Main Base in Adelie Land, a new country discovered by Sir Douglas. This base was under his own command. It comprised a wireless and scientific station and staff, and from here the longest exploratory journeys were made. No less than 2,600 miles were sledged from this station, entirely over countries previously unknown. The Western Base was in Queen Mary Land, discovered by Captain Davis. This was under the leadership of Mr. (now Commander) Frank Wild, and also included a scientific station and staff. Eight hundred miles were sledged over new lands from this station. A third station was fixed on Macquarie Island, with a second wireless and a third scientific staff; and the explanatory and oceanographical work of the "Aurora" is worthy of separate mention, to the credit of Captain John King Davis, the second in command of the expedition. He discovered two new seas, one of which has been suitably named after him, to the south of which, for the most part, about 1,400 miles of new land was brought to light, with archipelagoes of islands, the biggest floating ice-tongues yet known, the Shackleton ice-shelf and other interesting features. The glacierisation of these lands is the heaviest that has been met with hitherto, and the winds are the most devastating in the whole world. Stupendous ice-phenomena were seen in these newly-discovered parts, including the largest iceberg on record, 40 miles long. All the scientific work of this expedition was excellently done and its memoirs are awaited with no little impatience.

Sir Ernest Shackleton's second expedition[2] is the most glorious failure in the polar annals. A large amount of new and important information was obtained, in spite, and yet partly in consequence, of the besetment of both the ships. The Caird Coast, which was discovered, is about 300 miles in length, and joins up Bruce's Coats Land with Filchner's

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[1] See Chart No. 2.

[2] See Chart No. 3.

Leopold Land, both of which were verified, and making 500 to 600 miles of continuous coast-line in this part of Antarctica. To this must be added the results of the splendid series of soundings and dredgings made after the besetment of the "Endurance," which virtually prove the existence of at least another 300 miles of coast to the west of the ship's track. This, also, should be placed to the credit of Sir Ernest, although the land was never with certainty seen. It lay to the north-west of the Wilhelm ice-shelf, with which it is undoubtedly continuous; so that Sir Ernest virtually has the credit of showing that as much as 1,000 miles of continuous land exists in this part of the Weddell Sea. Morrell's mythical land, which Bruce named "New South Greenland," was wiped off the map. It is hardly possible that it was even a small island, and was more likely an iceberg. A lot of valuable scientific work was accomplished by the staff; and the drifts of both vessels showed the direction of the ocean currents; the drift of the "Aurora" being particularly interesting in this respect.

We are now in a position to tabulate the results achieved by the foregoing expeditions, as judged by the amount of new land discovered. The figures in the following table are only approximate, but all have been prepared with equal care and by the same method of measurement on the charts:—

*Miles of land and shelf ice discovered and explored.*

| Year. | Leader. | Discovered. | | | Explored. | Total. discovered |
|---|---|---|---|---|---|---|
| | | Land. | Shelf ice. | Total. | Land. | and explored. |
| 1840. | Ross | 600 | 400 | 1000 | None | 1000 |
| 1902. | Scott | 900 | 150 | 1050 | 200 (about) | 1250 |
| 1908. | Shackleton | 1035 | ? | 1035 | 300 | 1335 |
| 1910. | Amundsen. | 1300 | 450 | 1750 | ? | 1750 |
| 1910. | Scott | 285 | None | 285 | ? 100 | ? 385 |
| 1911. | Mawson | 1440 | 400 | 1840 | Most of this | 1840 |
| 1914. | Shackleton | 300 | ? | 300 | None | 300 |

This table gives simply the geographical results of each expedition. It will be seen that Sir Douglas Mawson's total is the greatest, and yet he might lay claim to even more than he is credited with here. As he discovered and explored so much, care has been taken not to over-estimate his results. Amundsen, owing to his skill in the use of dogs, comes next, but his maps make accuracy difficult. Mawson's result, for

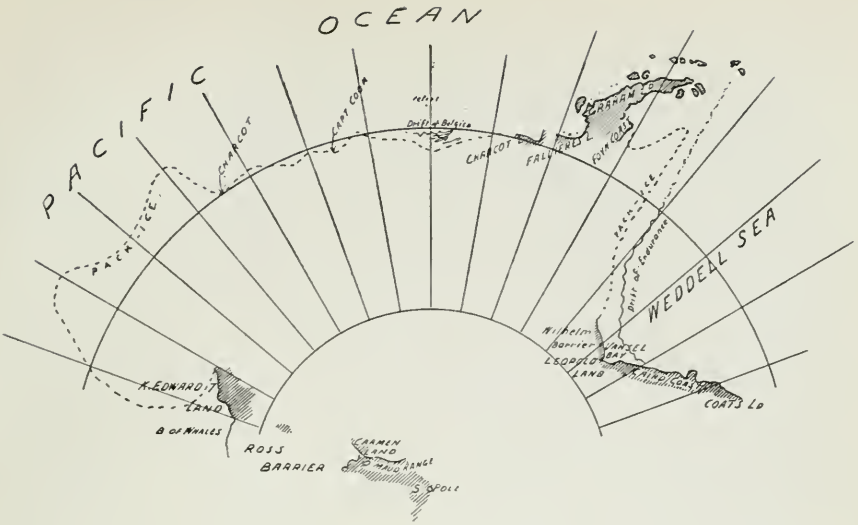

Fig. 3. (213) Pacific side.

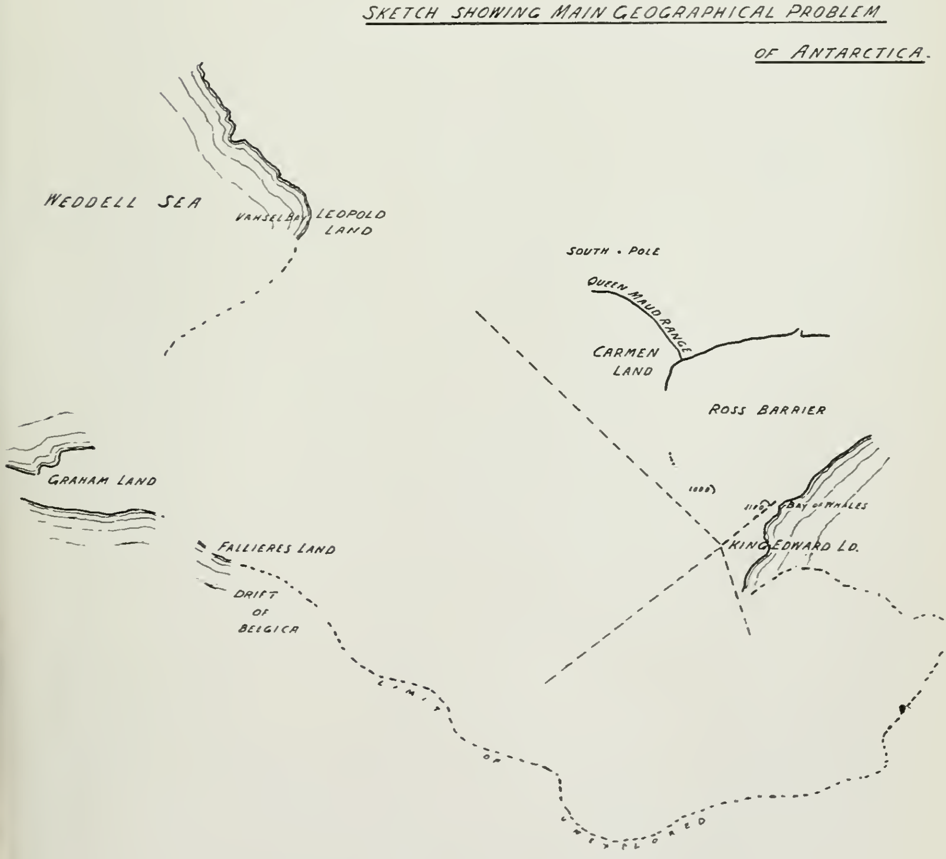

Fig. 5. (226) Sketch map, main problem.

one expedition, is magnificent when his scientific work is also included. The only two expeditions which used dogs are a long way ahead of the others. The expeditions of Scott and Shackleton begin to show a remarkable equality which the subsequent tables accentuate. The four expeditions of these two explorers fall into two pairs, their first and their second expeditions. In each pair the discoveries, apart from explorations, work out to within 15 miles of the same amount. The margin of error is as much as this, so there is nothing in it. Anyone could alter these results, possibly with good reason, but it would be by reducing, rather than by increasing, the distances given. It seems better that they should stand as they are, for there is nothing to choose between the work done by these two truly great British explorers.

A different result is seen in the totals for each explorer when shelf-ice is omitted. *Shelf-ice is not land*, so that this analysis is a perfectly fair one. Shackleton is the only explorer, with whom we are now concerned, who discovered no shelf-ice, except that which fronted his Caird Coast. Probably there was a lot of it there, but the continental land lay behind it.

*Land only.*

| Discovered. | Miles. | Discovered and explored. | Miles. |
|---|---|---|---|
| Mawson ... ... | 1440 | Shackleton ... ... | 1635 |
| Shackleton ... ... | 1335 | Scott ... ... ... | 1485 |
| Amundsen ... ... | 1300 | Mawson ... ... | 1440 |
| Scott ... ... ... | 1185 | Amundsen ... ... | 1300 |
| Ross ... ... ... | 600 | Ross ... ... ... | 600 |

The final totals of the work of Captain Scott and Sir Ernest Shackleton startled their compiler. Two years had elapsed between beginning to collect the data of the several expeditions and the final summing up. It was interesting to discover how the achievements of our two leading explorers would compare; but it was with the greatest surprise and pleasure that the following results were observed:—

*Land and shelf ice.*

| Discovered. | Miles. | Discovered and explored. | Miles. |
|---|---|---|---|
| Mawson ... ... | 1840 | Mawson ... ... | 1840 |
| Amundsen ... ... | 1750 | Amundsen ... ... | 1750 |
| Scott ... ... | 1335 | Scott ... ... | 1635 |
| Shackleton ... ... | 1335 | Shackleton ... ... | 1635 |
| Ross ... ... ... | 1000 | Ross ... ... ... | 1000 |

It is indeed most remarkable that Captain Scott and Sir Ernest Shackleton, alike in the successes of their first expeditions, alike in their disastrous second expeditions, and alike in resigning their lives in the Antarctic, should have made also an equal contribution towards its discovery and exploration.

Statistics of this kind are no more than rough generalisations, and consequently require a few words of comment. Land may be explored with varying degrees of efficiency. The greater part of Antarctica has, so far, been merely charted. Very little of it has been thoroughly examined. Again, the above figures include hundreds of miles of continental ice which is, perhaps questionably, scheduled as "land." Figures can be arranged to prove many different things, but these are intended to give each explorer the fullest credit possible for his discoveries.

## II.—The Unknown.

### *Unexplored Antarctica.*[1]

Turning from the known to the unknown we must now set in order those parts of the continent which are still uncharted, gathering together whatever we can find in the nature of evidence relating to them. This will enable us to see, and to segregate, the main geographical problems confronting us in Antarctica, and should place us in a position to consider their exploration.

### (*a*) *Coastline.*

Let us begin with the coast and review what is known of its uncharted spaces in their order of magnitude.

*Section 1.* By far the biggest gap is that which stretches between Coats Land and Gaussberg (King William II Land). This is so extensive a hiatus that the term "gap" is not properly applicable to it, for it extends over, perhaps, one-fifth of the whole circumference of the continent, as nearly as it can be estimated. This huge land-mass, about 2,400 miles in length, has never been trodden by man, and is almost entirely unknown. Only two navigators have ever laid any claim to have seen so much as a fraction of it. They were both Enderby's skippers, Biscoe and Kemp. The former in 1831 sighted "black mountain summits" at a distance of "about

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[1] See Chart No. 6.

12 leagues," and named them Enderby Land. The ship's position was 66° S. and 47° 20′ E. The latter, Kemp, is not so reliable, but he claimed to have seen signs of land, two years later, to the east of Biscoe's landfall. Biscoe's discoveries in Graham Land have been amply verified, and there is no reason to doubt the existence of Enderby Land, but it is questionable whether it has ever been seen again. The discovery of Kemp Land, certainly, has never been verified, so both lands remain unconfirmed; but Lieut. Moore tried to reach Enderby Land in the "Pagoda" in 1845. He was driven back by persistent gales, but when in latitude 64° S. and east of the 50th meridian he saw an undoubted appearance of land. He had no doubt that it was land, but would not say so without landing upon it. This may be a verification of Enderby Land. It was Sir Ernest Shackleton's intention, on his 1914 expedition, to send a party to trace out the coast beyond Coats Land "eastward towards Enderby Land," and the voyage of the "Quest" was partly for the purpose of exploring the greater length of this unknown section, or the stretch from Enderby to Coats Lands, about 1,400 miles in extent. As no land has been seen, however, a coastline as long as that of the Atlantic seaboard of the United States has only been sighted once with any certainty, and then it was at a distance of thirty miles when very little of it could have been discerned. The only further knowledge we have of this section is that Captain Cook found shelf-ice, 18 feet high, which barred his progress in latitude 67° 15′ S. and 39° 35′ east longitude. This information is sufficient to indicate the neighbourhood of land, which no doubt could be found by a suitable ship.

*Section 2.*[1] The second longest stretch of unknown coastline lies between King Edward Seventh Land in the west and the Charcot and Fallières Coasts to the east. The length of this breach in our maps is 1,300 miles in a straight line, so that the undiscovered coastline is at least 1,800 miles in extent, and should it follow the windings of the pack-edge it would be considerably longer than this. Cook turned back before the "mountains of ice" which guarded the middle portion of this hidden land. The "Belgica" drifted about near the eastern end, the soundings taken by de Gerlache making it certain that land lay to the south. But it is to Dr. Charcot that the greatest credit is due for exploring further than any other navigator in this locality. In 1910 the French explorer reached Cook's meridian, although he was 40 geographical miles north of the Englishman's latitude, or in 70½° S. Dr. Charcot believed that he could have pushed as much as 60 miles further south at that time, and that land was not far off, but his ship was damaged and he turned west. Before doing so, however, he obtained a sounding and a dredge in 1,000 metres, about 550 fathoms, and observed the same notch in the edge of the ice that Cook had found. He also noted that the tabular bergs were of colossal size and in great numbers, counting no less than 5,000 in 48 hours. This agrees well with Cook and augurs high coastal ice-cliffs. Dr. Charcot then entered new waters and passed the 70th parallel in 118° 50′ west. Here he obtained a sounding in 1,040 metres with a rocky bottom and writes: "There is therefore a big chance of land being not far from us, and perhaps in clearer weather we should see it . . . . This sounding seems to prove the junction of Fallières and King Edward Land." He finally accomplished the splendid feat of reaching the 124th meridian W., having sailed nearly all the time between the 69th and 70th parallels, and sometimes even further south. At the point where he eventually turned northwards he was no more than 600 miles from King Edward Land. Still, there is yet at least 1,800 miles in this section which no one has ever seen.

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[1] See Chart No. 3.

*Section 3.* From the Wilhelm ice-shelf in Leopold Land to the Foyn coast of East Graham Land is over 700 miles in a straight line, to which must be added at least 100 miles of Graham Land which has never been properly surveyed. Shackleton has written over it on his chart appended to "South," "Weather Island and Foyn Coast probably 2° further W." As no coast is perfectly straight there must be a full 800 miles here awaiting the cartographer. Sir Ernest had arranged for one of his coastal parties in 1915 to trace out this interesting shoreline. The soundings already referred to left no doubt that land extended from Vahsel Bay to about 72° S., whence it appears to bear away to the west. An "appearance of barrier, land or a very long iceberg about 20 odd miles away" to the west-south-west was reported by Shackleton during his drift.[1] He also mentions other indications of land, such as the grit in some of the samples from the sea-bottom and on the grounded icebergs. It is still possible that Graham Land may be cut off from the continent by some channel which may emerge in the neighbourhood of Fallières Land, but this will be referred to again. Here, then, is a third stretch of some 800 miles which has never yet been seen.

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[1] "South," p. 59.

*Section* 4.[1] The distance between *Sir Douglas Mawson's* Wilkes Land, never seen by Wilkes, and Queen Mary Land is nearly 800 miles in a direct line. This unknown coast is probably not much indented, so that 850 miles may be a fair estimate of its length. The voyages of Wilkes and others may well be passed over in favour of more recent and reliable expeditions, with this remark: that none of his supposed landfalls have been seen since, and five out of the seven that he claimed have been proved not to exist where charted by him. Both Ross and Scott have sailed their ships over some of them. On Jan. 23rd, 1912, the "Aurora" also sailed over the charted position of D'Urville's Cote Clarie as well as over land east of Wilkes' C. Carr, but, on entering the section we are dealing with, she was forced to the north by solid floes, and it was not until Jan. 31st that she was able to turn southward again. They then "passed to the south of Balleny's Sabrina Land without any indication of its existence," which, as Captain J. K. Davis says, was not at all surprising. They made the ship fast at noon, the weather was clear, and they got good observations, within seven miles of Tottens High Land on Wilkes' charts, so that, as he writes, it "either does not exist, or is situated a considerable distance from its charted location." A sounding here gave 340 fathoms, and next day, some miles to the north-west, another gave 927. The ice prevented them from approaching any of Wilkes' other charted landfalls, but they discovered the great Shackleton Ice-Shelf, computed to run about 200 miles along the land, and to extend 180 miles seaward. They named the Termination Ice-Tongue after Wilkes' mythical Termination Land, *the position of which it occupies.* Again in Feb., 1913, and a third time in Jan., 1914, the "Aurora" made the same trip, but nothing whatever was seen of the land. A good series of soundings showed that it could not be far away. Thus Sir Douglas Mawson, like Ross and Scott, had the distinction of wiping land off the map, though, like his illustrious predecessors, he added a great deal more to it, outside this section of the coast. 850 miles here is unknown, but enough has been found at each end of it to make future explorers careful in attempting to discover it.

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[1] Charts 2 and 6.

These are the only long stretches that await exploration. They total, according to the foregoing estimation, about 6,000 miles, or about 1,000 miles more than the length of coastline already charted in Antarctica. Sufficient work lies here for a very high-class expedition, without considering any further explorations, but as a comprehensive survey must be made of the whole problem, we are now to consider three shorter lengths of shoreline which, if not entirely uncharted, have never been explored.

*Section 5.* From Cape Freshfield in King George V. Land to Cape North is about 350 miles in an air-line, but about 40 miles at each end of this has been seen. Probably we shall not over-estimate the length of this coast at 350 miles, none of which has been explored. The lamentable loss of Lieut. Ninnis prevented Sir D. Mawson from extending his survey of the western end some distance towards Oates Land, with which he might possibly have been able nearly to link up. As to the eastern extremity of the section, Sir Ernest Shackleton, on returning from his first expedition, discovered 45 miles of new land to the west of Cape North. The position of the "Nimrod" was then 166° 14′ E. and 69° 47′ S., or nearly abreast of the Cape.[1] This land is shown on the chart in Vol. II. of "Scott's Last Expedition," yet Commander Pennell writes, on page 361, "No ship previously had had the good fortune to get in sight of the coast west of Cape North." He cannot have seen Shackleton's account, though it was published more than a year before Scott's expedition sailed. Truly no previous ship had the luck of the "Terra Nova" in these waters, for when in 164° 30′ E. and 69° 10′ S. Pennell discovered new land with snow-capped mountains, which he named after the heroic Captain Oates. Oates Land is nearer the middle of the section. A sounding here gave 178 fathoms. The pack prevented them from approaching nearer than 8,000 yards from the end of a glacier tongue, where they obtained another sounding in 134 fathoms. A rugged range of hills with outcroppings of rock and high cliffs were seen. The pack forced the ship from the land as she worked westward and visibility

[1] "Heart of the Antarctic," ii, 361.

was low, but another cliffy coastline was subsequently seen, with open water inside the pack. At one place this pack was only a mile broad, but apparently they could not work through it. The depth here was 154 fathoms and " the coast was steep and rugged, half-bare rocky points separated by glaciers being the chief features." Perhaps 100 miles of new coast was discovered.

Two hundred and fifty miles of coastline in this locality remain unknown, and the whole 350 miles require to be explored and surveyed from the land. There is a great difference in the character of the scenery at each end of this comparatively short stretch. Oates Land appears to be as mountainous as Victoria Land, whereas in King George Fifth Land the continental ice gravitates to the coast in one almost unbroken slope, ending in vertical precipices, except for some miles of enormous *rock* cliffs, 1,000 feet high.

*Section 6.*[1] The greater part of the eastern coast of the Ross Barrier, which is really a bay filled with shelf-ice, is at present unknown. It is 300 miles from Prestrud's farthest south, and 400 miles from King Edward Land, to Carmen Land, but between the 81st and 82nd parallels Amundsen found an undoubted appearance of land. He thought this was probably a continuation of Carmen Land, but no one has traced it out. Sir Edgeworth David has drawn attention to the importance of this district in a paper which appeared in the " Geographical Journal " for June 1914. In this he informs us that the Japanese Antarctic Expedition of 1911 travelled 150 miles south-east from the Bay of Whales, reaching an altitude of 1,000 ft. He says, "Although no rock was visible at the surface, land must have been present beneath, just as was the case at the large ice-covered island immediatley south of Amundsen's winter quarters at Framheim." As Prof. David adds, " sufficient prominence has not been given as yet to this, for it bridges over the gap between King Edward Land and Amundsen's ' appearance of land.' " We are still in need of a methodical survey of this coast, but the geographical problem presented here will be taken up shortly.

*Section 7.* · The last of the principal unexplored portions of coastline is the southern side of the Ross Barrier, from the Shackleton Inlet to the mountains of Carmen Land. This has merely been crossed in two places, nearly 200 miles apart.

[1] Chart 1.

Shackleton discovered the fine range of mountains which forms the coast here, and showed it on his chart extending over 100 miles to the south east; he named one peak, at a distance of 55 miles from his route, Mt. Catherine. The angle which this coast subtends to the polar routes makes it much more favourable for observation from the Norwegian than from the British route. Hence Amundsen could see nearly all of it, and named about 100 miles west of the Axel Heiberg Glacier, the Crown Prince Olav's Mts. Captain Scott, on his fatal journey, wrote of this coast as "a fascinating direction for next year's work," but no one has been along a mile of it between the Beardmore and Axel Heiberg Glaciers.

These are the principal portions of the continental littoral that are still either uncharted or unexamined, and it may be well to tabulate them before proceeding further.

*The Unknown Portions of the Coastline of Antarctica.*

| | Length. Miles. | |
|---|---|---|
| 1. Coats Land to Gaussberg. ... | 2,400, | of which 2,300 miles unseen. |
| 2. K. Edward L. to Fallières L. ... | 1,800, | entirely unseen. |
| 3. Leopold L. to Foyn Coast ... | 800, | entirely unseen. |
| 4. Wilkes L. to Q. Mary Land ... | 850, | entirely unseen. |
| 5. K. George L. to Cape North ... | 350, | of which 250 miles unseen. |
| 6. K. Edward L. to Carmen Land | 400, | probably 300 miles unseen. |
| 7. Beardmore Gl. to Heiberg Gl. | 200, | entirely unexplored. |
| | 6,800 | |

Sir Edgeworth David estimates the length of the whole coastline of Antarctica at 14,000 miles, of which, he says, 4,000 miles has been "approximately explored."[1] The latter figure was probably correct at the time of writing, but the estimated total for the whole continent seems based on the assumption of a much more indented coast than is likely to be found. The present writer would hesitate to add more than 200 or 300 miles to his own estimates of the uncharted spaces, which would bring their total up to about 7,000 miles. The coasts already charted amount to about 4,600 miles, or about 5,000 miles if shelf-ice is included. Thus the continental coastline would only reach about 12,000 miles, or 2,000 miles less than Prof. David's estimate. There is no need to labour the discussion of this point here, and no one would lightly contend with one of the greatest authorities on Antarctica. Some of the unknown coasts *may* be very much indented, but the continental ice must have covered up most of the inequalities. The present estimates have been designedly conservative, so the truth may lie between the two results.

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[1] *The Geographical Journal,* June, 1914.

In addition to the uncharted coastline there are many inlets, on coasts already known, which have never been explored, and there is the vast interior. The inlets we must now pass over, but the interior requires our attention.

(*b*) *Interior.*

Some guiding principle seems to be needed in setting out on such a hope-destroying quest as the exploration of the interior of Antarctica, and surely this may be found in the great law that has governed all advancement of knowledge, *progress from the known to the unknown.* Applying this rule to the simplest example, a beginning might be made with the northern part of S. Victoria Land,[1] the mountains of which were first sighted by Ross. Very little that was beyond his ken has been seen in this region since, partly because it is a dangerous coast, partly because of its distance from the geographical Pole, and yet, very largely, because mountaineers have never been taken out there. This country may be nothing more than a mountain district dwindling into nunataks on the continental ice, but it should prove of great interest to both scientists and sportsmen, and must certainly be charted sometime.

Another part of the interior that would amply repay the modest cost of exploration is that of Graham Land.[2] Dr. Charcot recognised this, and sent out a party which ascended a glacier, but got blocked at an altitude of nearly 1,000 metres, and at a distance of 25 kilometres from the coast. No way could be found by which to reach the continental ice. On the other hand two of Nordenskjöld's men managed to cross a small part of the Louis Philippe Peninsula. An inland journey from the Fallières Coast would be a stiffer proposition, perhaps, but would be very valuable just now, as we shall shortly see. The mere plotting of nunataks does not seem worth troubling about, but the great mountain ranges must be fully traced out. One example will show the importance of this.

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[1] Chart 1. [2] Chart 3.

Biscoe reported that his Enderby Land was mountainous, and we do not yet know whether the Queen Alexandra Range, south of Shackleton Inlet, may not extend right across and join it.[1] This would have a most important bearing on the continental ice, as such a trans-continental range would separate the polar plateau from that of S. Victoria Land. Attention is directed to this because the mountains on the south side of this inlet, as far as they have been seen, do not show the slightest tendency towards diminishing; they are among the greatest in Antarctica, and may possibly even increase in size. We certainly cannot say that the existence of such a gigantic range is probable, but the unexpected has frequently happened in Antarctica.

The interior of the lands discovered by Sir Douglas Mawson may be left to their hurtling hurricanes for many years, but turning to another part of the continent a most interesting problem presents itself. This is in connection with Queen Maud's range, to the south-south-east of the Heiberg Glacier.[2] Captain Amundsen, on his return from the Pole, saw these mountains when as far south as the 88th parallel. From the clearness of the atmosphere he considered that they probably extended beyond his vision to the south-east, and had no doubt that they traversed the whole continent. His party was then about 30 miles from the edge of the plateau, so that the range may stand upon the border of the continental ice. This is the position of all the other mountains so far discovered in Antarctica. If this should be so, however, what are we to think of Carmen Land? Is there another portion of the continental ice there? If not, of what does Carmen Land consist? We want to know what lies behind Queen Maud's Range from the south. According to Amundsen's chart the mountains bordering Carmen Land and the Ross Barrier reach out in a north-easterly direction, or at approximately right angles to Queen Maud's Range; consequently an enormous area, of which we know nothing, must be enclosed between the two ranges, if they continue far. The main chain is represented as pointing towards Leopold Land, and ends, on the Norwegian chart, about 650 miles from Vahsel Bay; but Shackleton, in 1914, whose object was to

[1] Charts 1 and 6. [2] Chart 1 and 3.

solve this problem, saw no mountains from the "Endurance." The land before him was similar to Queen Mary Land, where the continental ice rises in one unbroken sheet from the coastal ice-cliffs to the plateau. If Queen Maud's Range, therefore, does not dwindle into mere nunataks, around which the continental ice-sheet sweeps into Carmen Land, it must bend northwards towards Graham Land. This it may do, and urgently needs to be traced throughout its whole extent. If one range *should* rise above the continental ice, and thus form a division in the plateau, other ranges may do the same; but, up to the present no mountains have been found except on the edge of the plateau, which appears to be one huge undivided plain. Queen Maud's Range also has an important bearing upon the next question that awaits discussion.

The most pressing geographical problem in Antarctica at the present is doubtless that of King Edward VII Land. Is it an island, an archipelago, or part of the mainland? Lieut. Prestrud found nothing but low-lying ice until he approached the coast. The Japanese reached an elevation of 1,000 feet at a distance of 150 miles south-east of Framheim. This point is only sixty or seventy miles from Amundsen's appearance of land. As to the waterways, the evidence points to one of two things: either a channel cutting through the east coast of the Barrier, which seems the more probable, and will be considered in a moment; or an indentation in this coast, south of King Edward Land. This land seems to have slender connection with the continent. The Alexandra Mountains may stand on a large peninsula, but the neighbourhood of Framheim has more the appearance of a number of islands with shoal water around them. If a channel should be found, insulating one or more land-masses, where is it likely to emerge? Mr. Griffith Taylor thinks it may emerge in Vahsel Bay.

Should the continental chain of mountains, which extends southwards from the Admiralty Range through Victoria Land, to Queen Maud's Range, continue much farther this will probably be found to be in the direction of Graham Land. If, therefore, any channels exist to the south or south-east of King Edward Land they are much more likely to emerge on the south-west of Fallières Land, into the Pacific Ocean, than into the Weddell Sea. The great distance from the Ross Barrier to the Weddell Sea, about 1,300 miles, is a strong argument for this, and so is the northerly trend of the eastern end of King Edward Land. During the drift of the "Endurance" there was no Fohn effect observed in the south-westerly winds. This points to low-lying country in the direction of King Edward Land, which was just what Prestrud found. Further, the "Endurance's" soundings indicated a bend in the unseen coast to the west, our Section No. 3, in about latitude 72° S. This bend may indicate either the entrance to a channel from the Weddell Sea to somewhere south-west of Fallières Land, or merely a bay in the unknown coast between Vahsel Bay and Foyn Land. A channel here seems quite possible, and the low-lying land may point to it, but Fallières Land, as far as seen by Dr. Charcot, was mountainous, and there is the possible continuation of Queen Maud's Range to be considered. The evidence is insufficient to negative the possibility of a continuous range into Graham Land, but exploration alone can solve the problem. Should there be no channel here the continent as a whole would roughly approximate to the form of Africa, with Vahsel Bay in the relative position of the Bight of Benin, and terminating in the Louis Philippe Peninsula.

### (c) *The Pole of Inaccessibility.*[1]

A comprehensive view may now be taken of the whole continent, mainly for the purpose of finding out its most inaccessible parts. Sir Ernest Shackleton's proposed trans-continental route would have divided Antarctica into two unequal parts. A line from Vahsel Bay, passing near the geographical Pole to the Beardmore or Axel Heiberg Glaciers, cuts across a comparatively narrow continental neck. The Graham Land side of this neck will be termed West Antarctica, or the Pacific side, and the larger portion on the African side, East Antarctica, following Nordenskjöld's suggestion.

Mr. Stefansson has shown that a point which he terms the "Pole of Inaccessibility" does not coincide, by about 400 miles, with the North Geographical Pole.[2] The South Geographical Pole was reached while the greater part of Antarctica remained unknown, hence it is a historical fact that the South Pole is not the most inaccessible part of the continent on which it lies. The Antarctic Regions differ so

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1. See Chart No. 4.
2. "The Friendly Arctic," pp. 9 and 731.

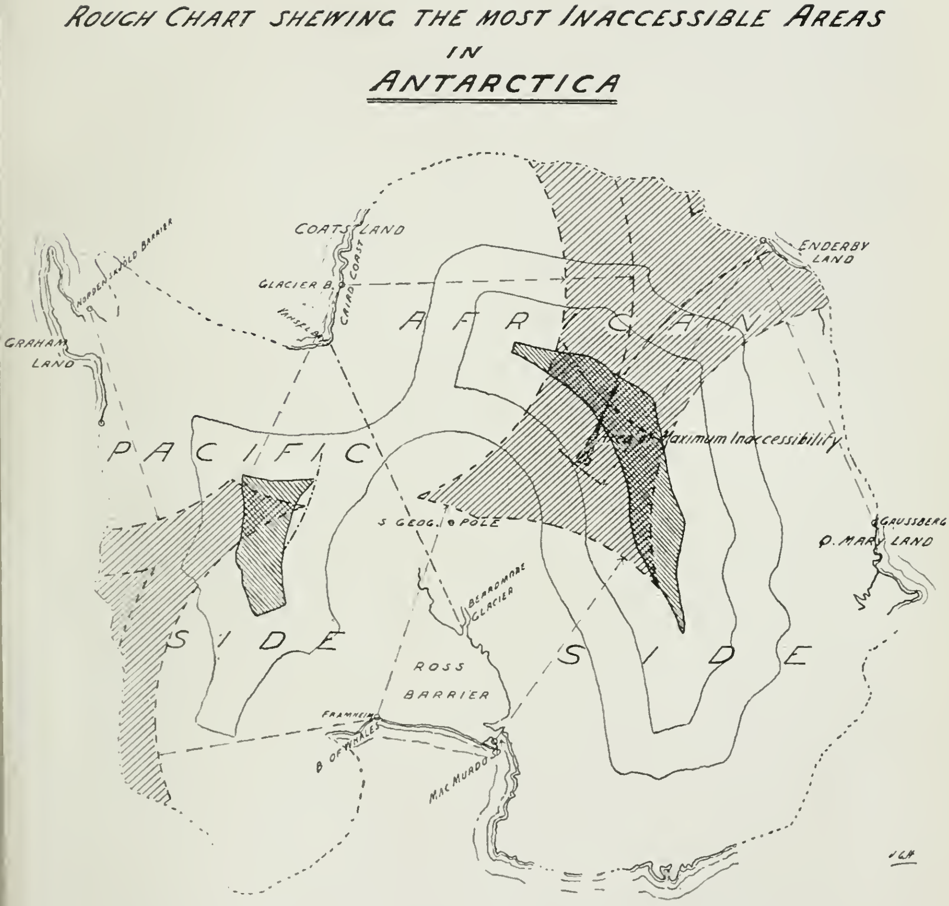

Fig. 4. (227) Diagrammatic chart, Pole of Inaccessibility.

much from the Arctic Regions, however, that we cannot assume there will be an exact counterpart in the south of the northern Pole of Inaccessibility.

Two methods present themselves by which to find what part, or parts, of Antarctica may be the most difficult of access. The first method is a modification of that adopted by Mr. Stefansson. Proceeding from the known to the unknown, *we know, first,* that inland sledge journeys can be made from MacMurdo Sound, the Bay of Whales, Glacier Bay on the Caird Coast and Gaussberg; also, almost certainly, from the Nordenskjöld ice-shelf. Sir Ernest Shackleton regretted that he did not land at Glacier Bay. Parties from both Drygalski's and Mawson's expeditions visited Gaussberg, and Nordenskjöld appeared to find no obstacle to much longer journeys than he made on the shelf-ice he discovered. We know, *secondly,* that sledge journeys of 750 geographical miles in length can be made from some of these points, and we may safely *assume,* as Shackleton assumed in 1914, that journeys of greater length than this can be made from other of these points.

If, then, a series of arcs with radii of 750 miles be struck from these bases on the map of Antarctica, as shown in dotted lines, the most inaccessible parts of the continent are revealed.

Nearly the whole of the Pacific side, or West Antarctica, can be reached by journeys of 750 miles from Framheim, Glacier Bay and Nordenskjöld's shelf-ice. If a land journey of the same length could be made from a base in the neighbourhood of Fallières Land the whole of West Antarctica could be explored; but if a landing is impossible on this coast a hundred miles must be added to the length of the journeys from the other points in order to cover the whole interior on this side of the continent.

Turning to the African side, or East Antarctica, it is seen that journeys of 750 miles from Glacier Bay, Gaussberg, MacMurdo Sound and Framheim leave a very large area beyond them. This is the most inaccessible area in Antarctica, and may be even more difficult to reach in practice than appears on paper, because it may not be possible to establish a base at Gaussberg every year. Queen Mary Land is farther away, and Enderby Land, which is the obvious base for this remote area, has never yet been reached. Even from Enderby Land a journey of 750 miles would by no means cover the whole of the interior.

Journeys of nearly 1,000 geographical miles (1,100 statute miles) from these bases, or 2,200 statute miles total length, will have to be made if this truly Antarctic Pole of Inaccessibility is to be attained. To speak quite frankly it may be doubted whether such journeys are at present possible under the conditions which it is known would prevail there. The distance alone might be done, but the combination of circumstances, the low temperatures and blizzard winds which would have to be endured for months, probably at an elevation of 10,000 feet, would make it the stiffest bit of exploration ever undertaken by man. This spot is the most terrible place in the whole world, surrounded on all sides by a thousand miles of frozen hades.

By the foregoing method the most inaccessible parts of Antarctica have been located, but another plan has also been tried. Contours have been delineated parallel to the present "Limit of unexplored Regions," as shown on the charts of the Terra Nova scientific memoirs. The first contour is 360 geographical miles inland, and the others are each 180 miles apart. The result confirms, in a general manner, the results of the first method, but one or two new particulars emerge.

The innermost contour on the Pacific side of the continent, or West Antarctica, lies 540 miles within the unknown, and the most inaccessible part of it is no more than 600 miles from the edge. This means that the whole of this side should be reached in the near future. On the African side there is an extra contour, 720 miles within the present limit of the unexplored, which contains a space 1,200 miles long, and the centre of which is 800 miles within the unknown. It lies, roughly, along the 78th parallel, and its centre is near the 70th meridian each of Greenwich. The Pole of Inaccessibility may be said to lie about half-way between Kemp Land and the geographical Pole.

It will probably be some years before explorers are so short of work, and we may add, so tired of life, that they will attempt to reach this district, which is *the most inaccessible part, not merely of Antarctica, but of the whole world.* The geographical Poles have been found easier of attainment than the loftiest mountain summits, but Mt. Everest, and all the other highest peaks, are likely to be conquered before the foot of man treads the Antarctic Pole of Inaccessibility. The secondary inaccessible area, in West Antarctica, is a very different problem, and appears to lie near the heart of the continent.

We have now considered the unexplored portions of Antarctica, and may have some conception of the magnitude of the task that awaits us, if it is to be undertaken. Yet we cannot for one moment question this, for the greater the labour the greater is the honour in attempting to perform it.

## III.—KNOWING THE UNKNOWN.

### (*a*) *The two stages of future exploration.*

A general consideration of all the facts points unmistakably, in the writer's opinion, to the following simple classification of future efforts: *First*, Pioneer explorations and surveys; *Second*, Scientifically equipped expeditions. The need of this segregation of effort does not appear to have been recognised up to the present, because it is quite possible to combine both stages in one expedition. A little consideration, however, will show that they are not merely separable, but that just now there are great advantages in thus dividing the work. Pioneer surveys are in no way dependent upon detailed scientific work, whereas both the position of, and the results attained by, a scientific station are entirely dependent upon the pioneer's discoveries; this is merely saying that, in practice, geographical discovery is the foundation for all the other sciences. This is not philosophically true, of course, but new lands must be discovered and charted before the geologist, glaciologist, meteorologist, magnetician and other scientists are able to properly pursue their investigations. All are dependent, to some extent, upon the cartographer. It will be better, therefore, to treat these two departments separately, and perhaps we may resort to the tabular form, so distinctive of Antarctica.

| The PRELIMINARY RECONNAISSANCE | is to the | MAIN EXPEDITION |
|---|---|---|
| as Foundation | is to | Superstructure, |
| as Discovery | is to | Exploration, |
| as a survey | is to | Other sciences, |
| and as extensive work | is to | Intensive work. |
| SPEED is the first need in the one | | LEISURE, in the other. |

Hence the pioneer work is *mainly* physical, while the later efforts are *mainly* mental. It should now be seen precisely what is required. Each of these stages ought to be considered in detail, but a few words must now suffice. Let us first take the preliminary reconnaissance. Scouts must be sent out before the direction of the main advance can be decided upon. Hundreds of miles of country merely lead to districts where scientific stations should be set up. Breaking a trail is a speciality requiring a mobile force. We are only slowly recognising the distinction between the work of discovery, and its consolidation by what we may term "Station work," including in this, of course, the investigation of the district around the station. The first essential is a rapid survey, planned to solve the main geographical problems. This is fundamentally a matter of polar transport, the two great factors of which are dogs and fresh meat. For such a reconnaissance small units are better than large ones because they are speedier, and speed, which means distance, is the essence of reconnoitring. Each unit must be capable of driving at least twenty miles a day on an average, and double that distance when necessary. New land would then be rapidly opened up and charted.

When the pioneer parties returned with their maps and observations, scientific expeditions would be able to apply their efforts to the best advantage. We must restrict ourselves upon the present occasion to a few remarks on the situations to be chosen for future stations. If we keep in mind the broad principle of continually pressing upon the unknown, we shall see that the next great advance must be made by establishing scientific stations inland, in addition, of course, to stations in new coastal regions. An inland station at once presents the difficult question of heavy transport, which cannot be entered upon now; but the difficulties are not insuperable if the stations are reduced to a small enough scale. The time has certainly come when a methodical assault should be made on the interior of Antarctica. To this end a small experimental hut might be sledged to such a district as that of the Barne Inlet on the Ross Barrier.[1] Shackleton Inlet would be a much better situation, if it were possible to reach it, as it would give a better scope for work, but it is farther from the base, which would be in MacMurdo Sound. A winter station is urgently needed on the Barrier near the glaciers and mountains, and from which the continental ice could be reached by a short journey. Captain Amundsen has proved that a winter on the Barrier presents no difficulty, and Commander

[1] Chart I.

Wild's experience on the more exposed Shackleton Shelf is decisive as to the preservation of health while living on these ice-formations. Further advance would be regulated by the reports of the Barrier Station, but there is no doubt that the next hut could be fixed high up on a glacier, for this has already been done in Greenland. Captain Koch, in 1913, wintered on a glacier near the continental ice in Droning Louises Land, and his party were none the worse after enduring minimum temperatures of minus 72 degrees F.

It is suggested that a small hut be set up on the Beardmore Glacier near the Mount Buckley coal seam, for here nature has stored unlimited heat for the winter. The party stationed here should carefully investigate the possibility of pushing out one further station, as far as the edge of the continental ice. This may well be the final stage, and will not be taken without the gravest consideration. Mr. Priestley, who is one of our greatest authorities on this subject, has profound doubts as to the possibility of wintering on the continental ice, estimating the *mean* temperature at about minus 70 degrees F., and saying that the conditions would be "devastating." While this may be perfectly true we need not supinely admit defeat without making at least one determined assault on nature's most impregnable stronghold. It is not suggested that any attempt should be made to advance towards the interior of the plateau, but sooner or later a station must be placed somewhere on it. We know from Captain Koch's experience in Greenland that it will be quite possible to winter near Mt. Buckley, and the party here would be able to estimate the risk, if any, of pushing still farther up the ice-falls.

We are mainly in doubt as to whether the difference between the *minimum* temperature of minus 72° F., which Koch's party was quite able to endure, and Priestley's *estimated mean* temperature of minus 70° F. would prove unendurable. We have also to make allowance for the very safe instinct which dreads the unknown. Unknown dangers have been faced and surmounted continually up to the present, so there seems no reason why the continental ice of Antarctica should defeat us.

(*b*) *Future Expeditions.*

With a desire to be as practical as possible one or two suggested schemes for completing the exploration of Antarctica, in its most important features, will now be briefly outlined.

The most productive direction for a series of preliminary surveys would probably be on the Pacific side of the continent, and Section No. 2 of the uncharted spaces the best coastline to attack, for several reasons; among them are its great length, geographical importance with respect to the continental mass as a whole, and its possession of at least one excellent and contiguous base.[1] This base is the Norwegian station on the Bay of Whales, which is, of course, British territory. Amundsen knows something of two parts of this section, for he was mate of the "Belgica," and advises those who would explore the waters towards its eastern extremity to linger for some time off the coast, and await the separation of the ice from the land. He believes that in February or March the sea becomes navigable and the shores may be reached. Dr. Charcot also thinks that it may be possible to reach land near the middle of this section.

The ice should be thoroughly examined from about the 106th to the 124th meridians west of Greenwich. We must remember that Charcot claimed to find the same notch in the ice that Captain Cook reported, which looks like another Bay of Whales. The French explorer's soundings found bottom at only about 500 fathoms in two places. The lofty tabular bergs Charcot found denote either shelf-ice or a rocky coast which would shelve steeply, and which may not be far from his positions, as indeed he supposed. The prospect of reaching land here seems to be hopeful, but it is not improved by the fogs which hang about the district.

If it is possible to land a station here, three units of three or four men each should be left, to form two coastal parties and one for inland exploration. Failing a landing here there would seem to be no difficulty about establishing a station on some part of Fallières Land, or in its neighbourhood. Dr. Charcot could have done so in Marguerite Bay, south of Queen Adelaide Island, had he been prepared to send his ship north for the winter. Two or three other units might be landed at Framheim. One unit from each of these bases, the following summer, would work along the unknown coast towards each other. The second Framheim unit to strike out for the heart of the continent in a south-easterly direction, with the purpose of solving the problem of the waterways, of then pushing on into the assumed extension of Carmen Land, and, if possible, of reaching as far as the Queen Maud Range. This work may involve a longer journey than any yet attempted, but polar travel is no longer the sport of speculation. The element of risk is very much less than it used to be, and the field of operations is enormously extended. The writer cannot see that there is any particular limit to the length of a journey, except that imposed by the number of dogs that one man can drive, for the whole distance is built up on a foundation of depôts, and that can be made almost whatever you will. The possible mileage which may be covered depends upon two factors, depots and tractive power, the latter practically resolving itself into speed. An excellent illustration is at hand : if the Norwegians could deposit, as they did, nearly two tons of stores at a distance of 100 miles south of Framheim, another half-ton at 160 miles, and again over half a ton at 220 miles along their route to the Pole, whereby they were able to reach a point 800 miles away, then the British can run out a main depot of three or four tons, 150 miles east of the same base, with further supplies en route branching from there as far and of such quantity as the length of each journey may require. An outward journey of a thousand miles should be a practical proposition in these parts, for great elevations would not be expected, nor very severe blizzards.

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[1] See Sketch Map No. 5, and Charts 3 and 6.

Incidentally it is well worth notice that Amundsen had three tons of supplies spread over 226 miles, which works out at 390 ton-miles,[1] whereas Scott had only one ton 140 miles out, or 140 ton-miles. But the Norwegians had only five men to divide into their 390 ton-miles, which left 78 per man, while the British, having 18 men to feed, their figure comes out at 7.8. The Norwegians, therefore, had exactly *ten times as much food per man as the British had deposited on their route.*

Returning to King Edward Land we find that, ideally, three units would be needed, to work south-east, north-east, and north from the main depot, until the coastal parties should find out something about the configuration of the coast, when one unit might be able to return. Mawson's system of a far eastern party would apply here, this party taking a line towards the eastern base, while a northern party solved the mystery of the great bulge in the pack beyond Scott's farthest. Depots would first be laid on all the routes, the inland party pushing their depots out to the assumed eastward extension of Carmen Land. If McClintock and Peary could use the winter moons for depot-laying in the north, we can surely do the same in Antarctica. The temperatures are low, but there is not much wind in King Edward Land, and these journeys would only be made over the well-trodden path to the main depot. During a second season a journey might be made diagonally across the Barrier, and the Shackleton Inlet explored; unless it was proposed to make use of the old MacMurdo Sound bases for examining these inlets. The Queen Alexandra Range should be traced out, and the return to Framheim made so as to plot the south coast of the Barrier. If this party were also able to strike into Carmen Land the depots of the south-eastern party should be picked up; but this land may consist of nothing but mountains. The leader of each party should have a free hand to proceed wherever most could be added to his chart.

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[1] 2 tons at 100 miles = 200 ton-miles.
$\frac{1}{2}$ ton at 160 miles = 80 "
$\frac{1}{2}$ ton at 220 miles = 110 "
390 "

From *the eastern base* a western coastal party would advance towards King Edward Land, and an inland party attempt to make a cross-country journey to the Weddell Sea, unless the base should be established near the middle of the section. From Fallières Land the distance would not be more than four or five hundred miles, but should the station be far to the west any attempt to reach the Weddell Sea would depend upon the first season's work of the eastern coastal party. If this party were able to link up with Charcot or Fallières Lands the journey to the Weddell Sea might be accomplished by working depots out far enough, and if reached, and a depot were able to be laid on the Weddell coast, the party could divide in order to explore in both directions. It might be possible to link up with Nordenskjôld and Filchner in this way, which would be safer, though more cumbrous than attempting to land parties at each end of the Weddell coast, with instructions to cross over to the Pacific when they had met.

The journeys sketched out would solve the greatest outstanding geographical problems of Antarctica. A dozen men at each base should be able to carry out some such programme

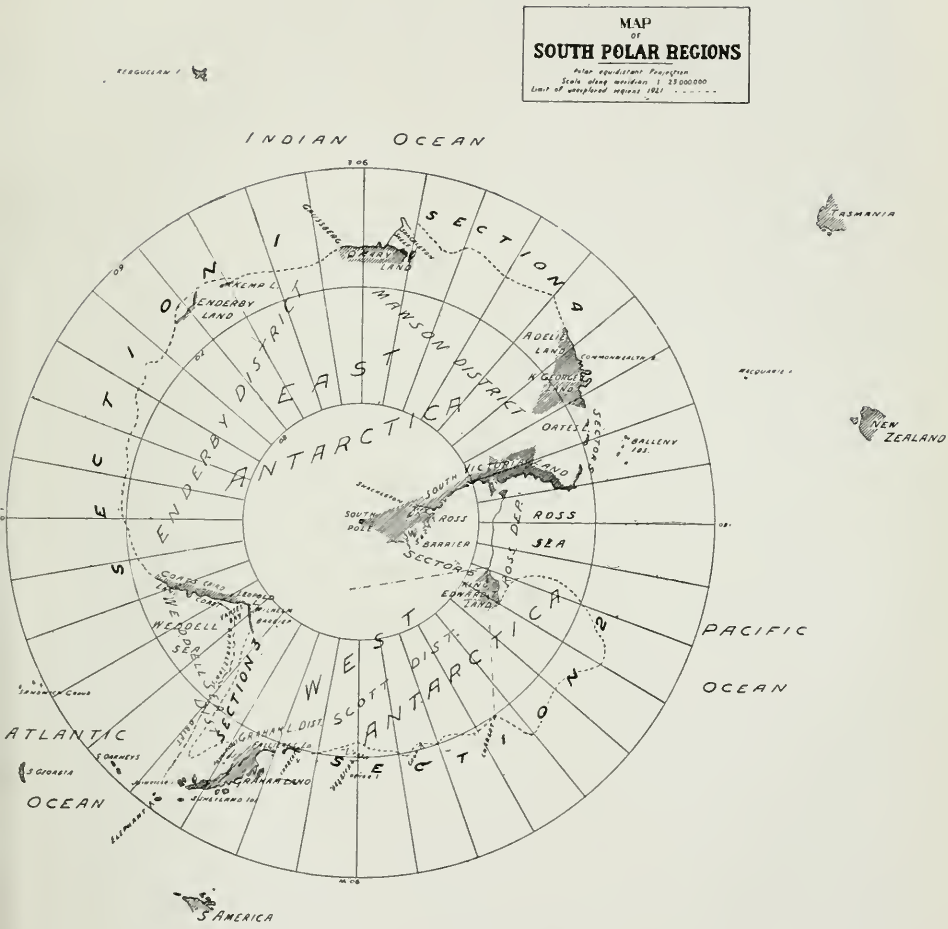

Fig. 6. (215) South Polar Regions.

in two or three seasons, and if circumstances were favourable they might brilliantly exceed it; provided that they were the right men for the work and had plenty of good dogs. The bulk of the food for the one base, and probably for the other also, is on the spot in the form of seals. On the return of this reconnaissance the main scientific effort could be planned, and would be in a good position to take up the consolidation and extension of the work. It would be well if the expedition could remain in the field until its work was quite finished, even if this meant continuing as long as four or five years. This length of time has often been spent in the Arctic.

*The second great problem* is that of Section 1, the African Quadrant,[1] which has so far disdained all the attentions paid to it, perhaps because, like a lady of quality, it has not been wooed with sufficient ardour by suitors of the highest distinction. Two thousand miles of ice-bound coast could not be expected to yield to such vessels as have been sent against it up to the present. The means must be adequate to the needs of the case. The coastline attacked by the "Aurora" was equally forbidding, but it was forced to surrender a thousand miles of new land to Sir Douglas Mawson. Could the same men, with equally good equipment, start where the Australasian Expedition left off, who will venture to predict that they would not meet with at least equal success? Nothing less will ever break down the resistance of this austere coast, where conditions are much more severe, and the glacierisation is heavier than in the Ross Dependency.

The prospect of exploring this section may not be very alluring, but there is plenty of room for surprises in 2,000 miles of unknown coast. The unexpected happened when Ross broke through the pack which the great Captain Cook had affirmed could contain nothing worth finding, and it is probable that most interesting discoveries will be made in this section. Biscoe was a reliable observer, and he saw mountains with bare rocky peaks in Enderby Land, so that more fine landscapes, as beautiful as those of Victoria Land, may yet be recorded by the Pontings and Hurleys of, we hope, the not too distant future. Coats Land can be reached, and its coast might be traced by land, if not by sea, for many hundreds of miles. We may not, however, indulge in any further speculations.

[1] Chart 6.

If we do not undertake this work very soon some other nation may do so, and as Antarctica would not exist without some ultimate purpose, it would be a pity to miss the present opportunity of acquiring it by right of discovery. This would not add much to our imperial responsibility, as the Government evidently thought by the Order in Council of last July, in which it is stated that " The coasts of the Ross Sea and the adjoining islands and territories, being a British Settlement, is named the Ross Dependency and placed under the Governorship of the Governor-General and Commander-in-Chief of New Zealand."

There is ample scope in Antarctica for the greatest exploratory enterprise that has ever been attempted. When, furthermore, it is remembered that this will be the last opportunity in the history of the human race to bring a continent into the realm of knowledge and experience surely the labour must be considered as of sufficient dignity to be undertaken by the greatest of human institutions. It is true that an individual with a great enough soul, could one be found to take up this work, would be better than any association of men : for the greatest institution is the State, which, in " these degenerate days," cannot be relied upon for the advancement of learning. But although individuals exist who are wealthy enough to finance the whole enterprise they would require guarantees that their money would not be wasted. These guarantees could be given by our universities, which are the proper institutions for undertaking geographical research.

Our universities, perhaps, might do well to consider whether they can justly claim to comprehend all human knowledge. They tacitly assume, we believe, the affirmative; but the prevailing tendency of the human mind, at our seats of learning, if not elsewhere, appears to be subjective, towards intellectual over-refinement, to the loss of objective reality. Unless this tendency is checked and counter-balanced by continual reference to nature, progress towards ultimate truth will be hindered by years of wandering in the mists of error. Our greatest universities have recognised this as a general principle, by the attention they have given to natural science, but they have not yet completed what they have begun by sending out their own investigators into distant countries to collect their data first hand. The writer has learnt, since he first made this suggestion, that American universities are actually doing this, and several unofficial expeditions have gone out recently from both Oxford and Cambridge; but this work has not been recognised in England as one of the most important parts of a university's work. Geographical exploration, in one sense, is the foundation of a university's highest activities, for no scientific results are attainable from an undiscovered country, while scientists accompany and follow explorers. It is the explorer who first bears the torch into the outer darkness. Universities should send out and support their own explorers as long as knowledge remains unreaped and unrecorded. Exploration is the natural and necessary complement to the metaphysical studies of a university, for it controls the great sources of natural philosophy. Every seat of learning may be likened to a tree which needs to shoot out its roots into all parts of the world to draw from them its due measure of intellectual sap. Without geographical expansion our universities may become unduly intensive and grow out of harmony with nature and truth.

The Australasian universities, like those of America, recognised the truth of this argument, and sent out the finest expedition that has ever sailed to either of the Poles, that of Sir Douglas Mawson, which included seventeen university men. One of the most venerable and distinguished universities in the world, which devotes considerable attention to natural science, has in recent years become intimately associated with Antarctic exploration: we refer to the University of Cambridge. To Cambridge Scott came for the chief of his scientific staff in 1909, having previously chosen the same splendid man, Dr. Edward A. Wilson, of Caius, for his 1902 expedition. Altogether Scott had eight, and Shackleton five, Cambridge men, of whom three or four are now Fellows of different colleges. This Antarctic coterie, finding that facilities for working up the scientific results of their expeditions were sadly wanting, have been the means of establishing a Polar Research Institute at Cambridge, as a permanent memorial to Captain Scott and Dr. Wilson. The Scott Memorial Fund Trustees have granted several thousand pounds to the university for the necessary buildings. From this it will be seen that the University of Cambridge is pre-eminently fitted to complete the exploration of Antarctica, a work fully worthy of the university's attention. Members of other universities will not censure too harshly the writer's loyalty to his own. A combined expedition from several universities would appear to present difficulties of co-ordination, unless unofficially arranged. It is the duty of all geographical students to agitate for this work until it is done. Unless it is taken up soon we may lose the opportunity. The honour of completing the exploration of the last continent should be claimed by the British, and whoever makes this great work possible will be revered for all time as the last great patron of geographical progress.

# ROUMANIA.

By Miss E. M. Sanders, B.A.

(Delivered to the Society, December 4th, 1923.)

Roumania is one of the States whose area has been considerably increased since the war. A study of maps in a historical atlas shows the rapid growth of territory which has taken place since she gained her independence; its shows also that the latest addition has more than doubled the area of Roumania. These additions have altered the shape of the State; instead of being a spur-shaped area with the Carpathians as its northern border, Roumania is now almost circular in shape.[1] The Carpathians now form the nucleus of the State, surrounded by their foothills and bordering plains. Such addition of territory has greatly increased her importance, and it must be remembered that before the war she had already come into prominence largely on account of her oil-fields, although her wealth in agricultural products and timber was considerable. The object of this paper is to describe this new Roumania starting with the physical setting which has given the Roumanians their opportunities, and attempting to give an idea of the way in which they have made use of their opportunities.

## *Situation.*

Roumania is situated at the cross-roads of Europe, at the point where the Danube Valley, the great East-West route, meets the sea at the Black Sea coast, and meets the North-South routes from the Baltic to the Mediterranean Sea. She is also a land where East and West meet in another way, for the line which limits the eastern boundary of the deciduous forests passes through her territory. The western part of Roumania, therefore, resembles Western and Central Europe in its general aspect; the scenery is diversified by alternation of forest and grassland. Eastern Roumania, on the other hand, is more similar to the south of Russia, for the groups of trees are few and far between, and there are wide stretches of steppe, monotonous, treeless country.

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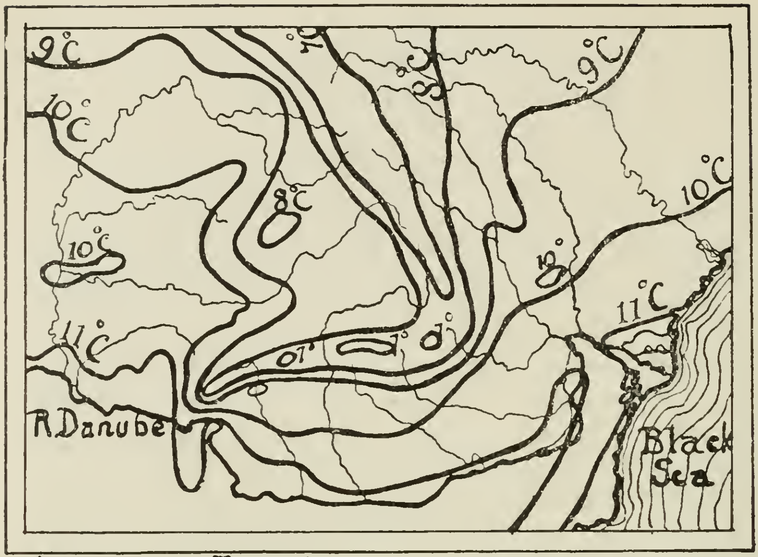
[1] Emmanuel de Martonne: La nouvelle Roumanie, *Ann. de Géogr.*, Vol. 30, 1921, pp. 1-31.



Annual Isotherms. after Murgoci & Burca.

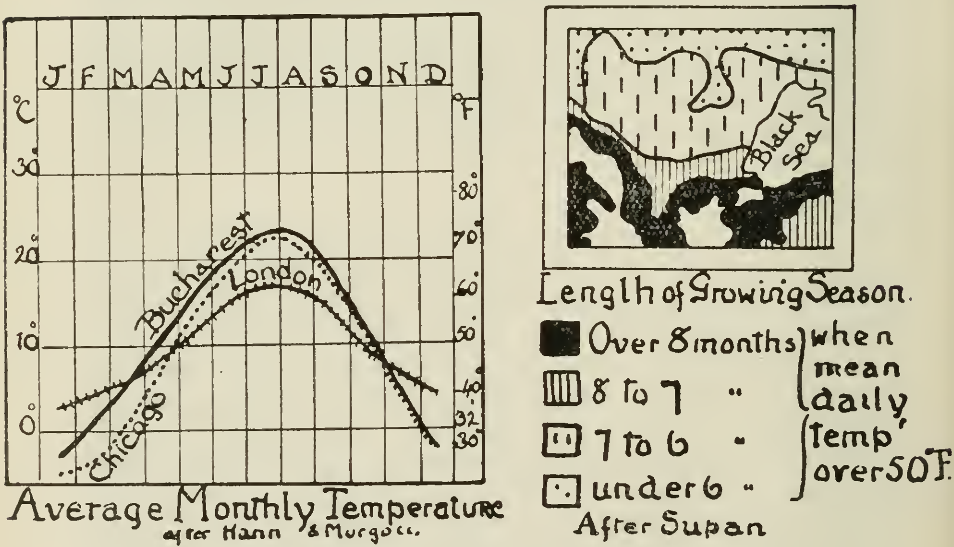


Fig. 1. Annual Isotherms after Murgoci and Burca, " Romania," Bucharest, 1916.

Average Monthly Temperature of Bucharest after Murgoci and Burca.

Average Monthly Temperature of Chicago and London after Hann. Length of Growing Season after Supan.

*Climate.*[1]

The general aspect of the country may partly resemble Western Europe, but its climate makes it a very different country to live in. The graph in fig. 1 shows that the average monthly temperature of Bucharest is more like that of Chicago than that of London. In summer the temperature not only rises to much beyond our greatest summer heat, but stays there for long periods. The air, however, is not damp during the hot season, and the nights are cool except for a week or two in the height of summer, so that the heat is not too enervating. There is a great deal of variety in the climate in the different parts due to the varying altitude. Fig 1 shows the effect of the Carpathians in mitigating the heat of summer by altitude, in providing shelter for Transylvania and the valleys and foothills from the bitterly cold north-east wind (the Krivetz) which sweeps across the frozen plains of Russia, and in giving the southern slopes possibilities for agriculture comparable to those of the Italian Alps, largely due to shelter and aspect. Characteristic winter weather is a bright, clear sky, with snow on the ground. The cold is severe for two to three weeks, but it is a dry cold with plenty of sun, and unless the Krivetz blows, is not unendurable. It is the Krivetz that causes the ports of the Black Sea in the northern part of Roumania to be hampered by ice. Spring comes early and rapidly, and autumn is a lovely season with bright sunny days.

Roumania is far from the Atlantic Ocean, and yet it is from the Atlantic that the cyclones come that give the northern part of Roumania its rain. Fig. 2 shows that the number of cyclones received during the year is not as great as those of England or North America. The arc of the Carpathians prevents the southern and eastern parts from getting any rain from these cyclones, the rain-bearing winds of these parts come from the south-east, and are part of the Mediterranean system of winds. The rain here comes in spring and autumn. Besides the violent rains of the cyclonic storms the mountains and hilly regions get gentle rain, and they never suffer from the droughts which are the fate of the plains from time to time. Fig. 2 shows the average annual rainfall; again the influence of the Carpathians is seen to be of immense importance.

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[1] Romanea. p. 45 and following pages. Murgoci and Burca. Bucharest, 1921.

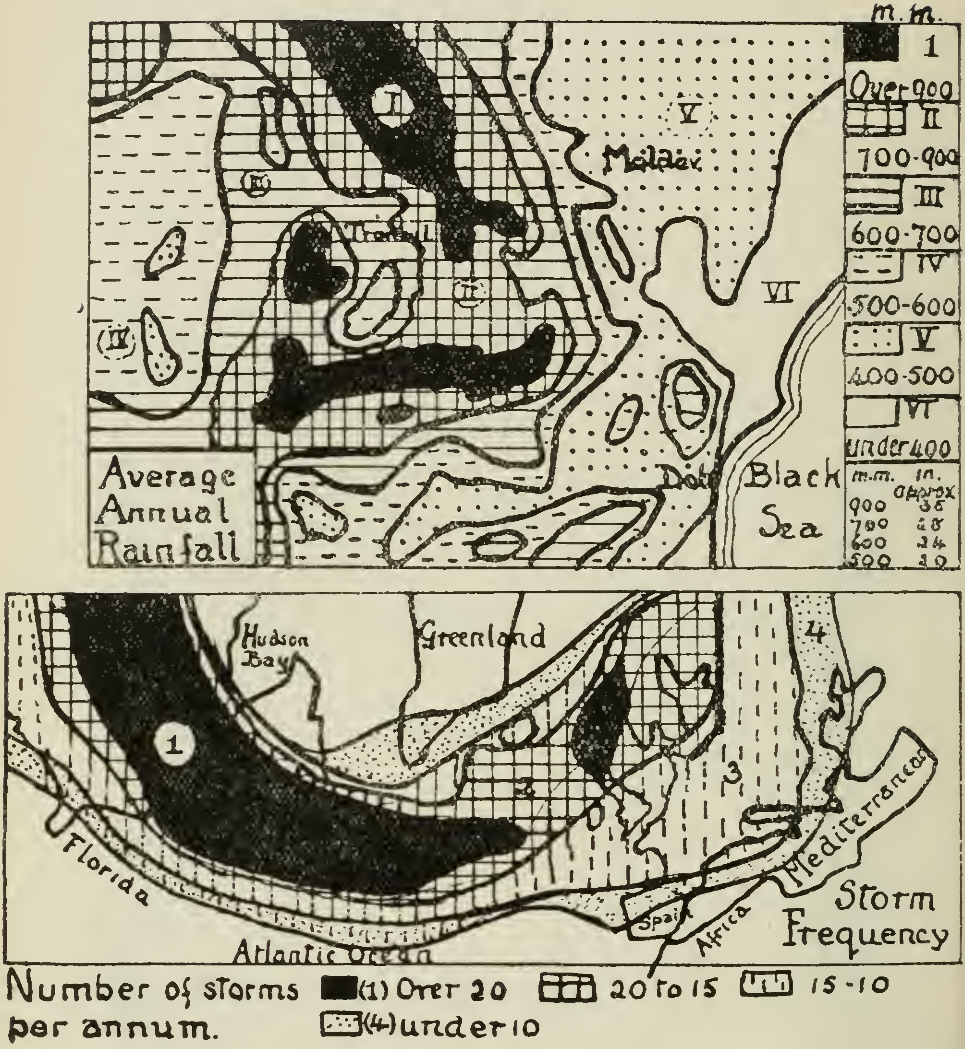

Fig. 2. Average Annual Rainfall after Murgoci and Burca, "Romania," Bucharest, 1916.

Storm Frequency after Dunwoody, Bartholomew's Meteorological Atlas.

To sum up, then, Roumania, like other lands with an extreme climate and a long enough growing season (fig. 1), is rich in agriculture possibilities, but the uncertainty of its rains is a serious handicap from this point of view. As to the effect of the climate on the people, it must be said that it is a good way from the optimum as defined by Huntington.[1] It is too extreme, and it does not get as much stimulus and relief from the cyclonic storms as the United States does—a feature which, in Huntington's opinion, redeems the climate of the Central and Eastern part of the U.S.A.

*Structure.*[2]

The opportunities enjoyed by the people differ very largely in the various natural regions of Roumania. The relief and soil vary in different parts, and it is the structure of the rocks underlying the land that is responsible in large measure for this variation. Fig. 3 shows in diagrammatic form the structure of the centre and southern part of Roumania. In this figure the Roumanian plains, which lie about the Lower Danube, are seen to be formed of the younger rocks (Tertiary covered by deep alluvium and loess), which have been deposited in a great depression lying between two ancient crust blocks. These ancient crust blocks form respectively the core of the Carpathian chain and the mountains of the Dobrubja. In the Carpathians the older rocks are often masked by younger rocks (Cretaceous and Jurassic) which have been laid down upon the ancient rocks, and which afterwards have been twisted and uplifted together with the old rock core. In the Dobrubja, on the other hand, the ancient rocks stand up unclothed with later deposits. Such is the structure of the Central and Southern parts of Roumania. Fig. 3 shows how a similar structure explains the conformation of the eastern parts. Again there are two ancient crust blocks, one of which is the core of the Carpathians while the other is the foundation of South Russia. The basin between the two has again been filled up with younger rocks and forms

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[1] Civilization and Climate. E. Huntington. Yale Univ. Press, 1915.

[2] See Emmanuel de Martonne : Recherches sur l'évolution morphologique des Alpes de Transylvanie (Karpates méridionales), *Rev. de Géogr. Annuelle,* Vol. 1, 1906-07, pp. xi-xxi and 1-279; *idem* : The Carpathians : Physiographic Features Controlling Human Geography, *Geogr. Rev.,* Vol. 3, 1917, pp. 417-437.

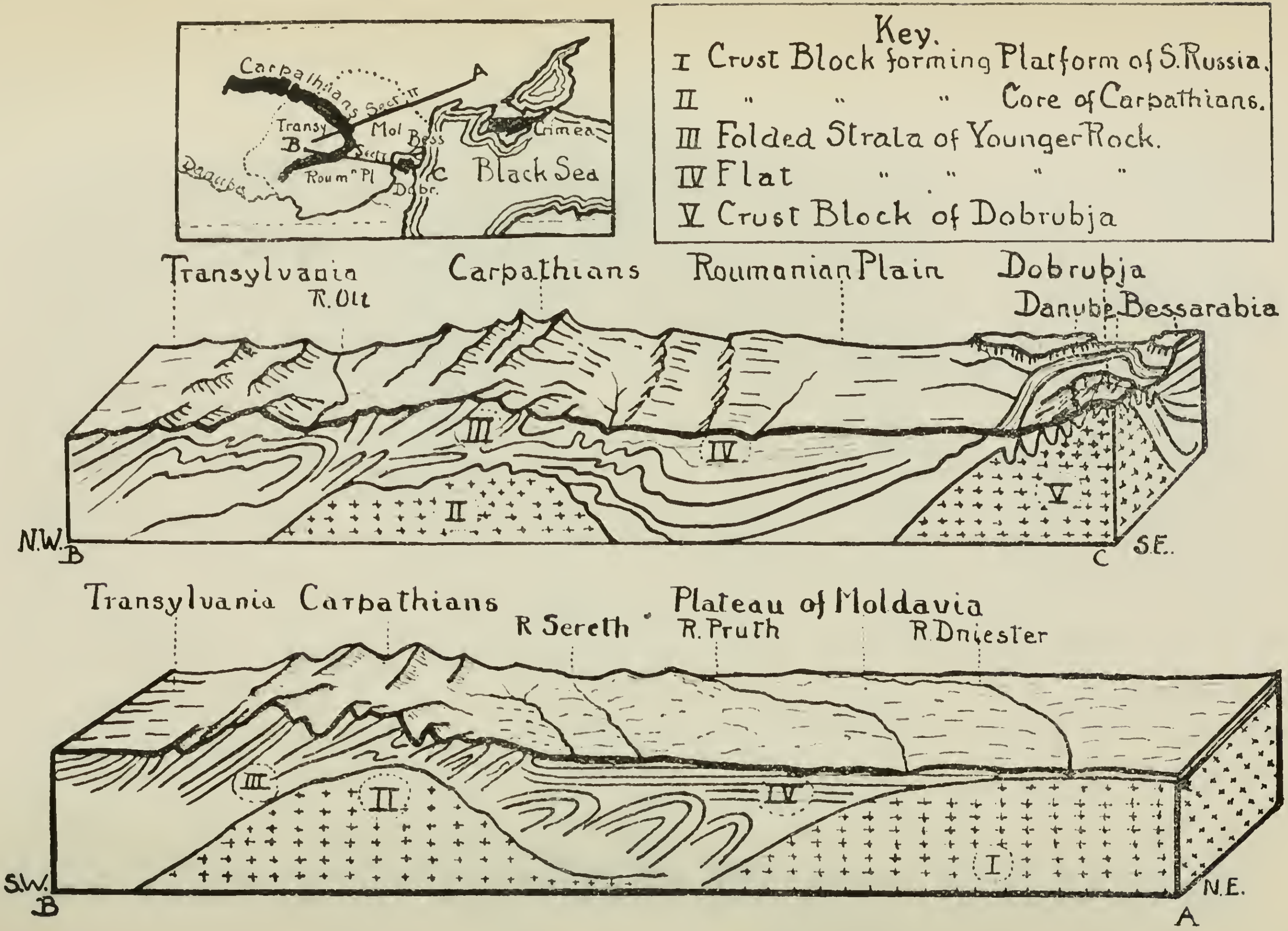

Fig. 3. Block Diagrams showing the structure of Roumania after drawings of Prof. Murgoci to illustrate sections in "Recherches Geologiques dans la Dobrubja," kindly sent by Prof. Murgoci.

a flat piece of land, which, however, is sufficiently high to rank as a plateau. Further, the plateau of Moldavia has not the thick covering of alluvium which gives to the Roumanian plain its exceptional richness.

To the west of the Carpathian block is the Basin of Transylvania, and here a process similar to that which has formed the Roumanian plain has been repeated again and again on a smaller scale. Basin after basin of ancient rock can be traced, each filled up with newer rock and floored with fertile soil.

Owing to the underlying structure, then, it comes about that the centre of Roumania is occupied by the rugged relief of the mountains of the Carpathian system and their foot-hills. To the south of these mountains stretches the fertile Roumanian plain, buttressed in the south-east by the mountainous Dobrubja and its bordering plateau. Eastward from the Carpathians stretches the Moldavian plateau, while to the west of the central mountains lies the basin of Transylvania. The basin of Transylvania is terminated abruptly on the west by the Bihar massif, an isolated mountain mass of the same structure as the Carpathians, and bordered like them by foot-hills. These foot-hills give place to the fertile river plains of the Banat.

Each of these major natural regions offers different opportunities to its inhabitants, and according to the measure of their success in adapting their life to the land, and in developing its natural resources, does each region make its contribution to the general wealth of the State.

### *Natural Regions.*

*The mountains of the Carpathian system and their foreland.* The mountains of the Carpathian system stretch in the form of an arc right across Roumania, as fig. 6 shows. They are of two types—the Alpine type and the Jura type. The former occurs in the south-west and extreme northern part of the chain, resembling the Alps of Switzerland, with lofty, jagged peaks indented by glacial cirques with lakes and cascades. The Jura type occurs in the central part of the chain, where the mountains are neither so high nor so continuous a barrier as the Alps, but resemble rather the Jura Mountains with flat-topped summits and rounded, wooded flanks. Figs. 4, 7, 8, and 9 show the scenery in the central mountain zone. Although it is isolated, the Bihar massif is part of the Carpathian system.[1] It is very rough country, rising sheer from the plains of the Transylvanian Basin on its eastern side and continuing westward with high plateau-like summits, diversified by volcanic relief, and deeply cut by streams.

These mountains are a "region of difficulty," although favoured spots occur, as they do in the Alps themselves, where a sheltered valley with favouring conditions of soil and aspect may constitute a small "region of increment." In such valleys are numberless settlements of the purest Roumanian type, often dating from the time when refugees from war or oppression fled to the mountains for shelter. Isolation has kept the type pure and enabled tradition to survive, while the character of the relief of the Jura type of mountains has afforded a continuous means of intercommunication between the different groups. The practice of transhumance, combined with the relief, has kept the Roumanian people together. The mountains of the central part of the arc of mountainous land are lower and have broad, bare summits which are a zone of movement, just as the bare scarp-lands of southern England were in the early days before the clearing of the forests. All along these summits are dotted little huts, which are the summer homes of the Roumanian shepherds, who tend their flocks on the mountains in summer and dwell in the winter in the valleys of the mountains and foot-hills. Here on these bare, grass-covered heights the tribes meet and exchange their news year after year, the mountains are the cradle and fosterers of Roumanian tradition.

From the modern business-man's point of view the zone of the high mountains is largely waste ground. It supplies timber, however, which is a very important asset for a country near the treeless countries of the Mediterranean and the steppelands.[2] There is building stone and the possibility of water-power, but in comparison with the foot-hill and plain the central mountains are poor in resources.

*The Foothills.* The Carpathian foreland of foothills is separated during a large part of its extent from the main mountain mass by a tectonic depression, a long series of troughs which present similar advantages for the people who live there as the foothill people enjoy. They are populated in much the same manner. The foothills rise on the other side of the depression; they are low hills, never over 2,000 ft. in height, the remains of a dissected plateau. The valleys are from 800 ft. to 300 ft. deep, exceedingly fertile and well-sheltered. A similar border of foothills stretches along the western side of the Bihar massif, as is evident from fig. 6. In this foothill region wooded hills separate the communities of the valleys, but intercommunication is easy; almost every valley has a string of villages almost touching each other, and the hills between the valleys are easily crossed. It is a region of strongly individualised communities, bound together by common tradition. These villages of the foothills have been long-established, and from them in favourable times the population has spread to the plains. The plains have been so often scourged by war that until comparatively recently they were hardly populated at all. In these valleys the Roumanians found plentiful timber for building and firing, a constant supply of pure water in the streams fed from the mountains, fertile soil in the valley bottom, and pasturage on the flanks of the hills. They have developed these resources in their own way and adjusted their life well to their environment, and a marked and very individual development of characteristic Roumanian culture has flowered in this region. Costumes, embroidery, legend and customs, houses with gay-coloured decoration and beautiful woodwork, all bear witness to the individuality and wealth of the culture. In the foothill region the population is often very great, as much as 75 people to a square kilometer, and sometimes even 100.[1]

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[1] Emmanuel de Martonne: Le massif du Bihar (Roumaine), Etude morphologique, *Ann. de Géogr.*, Vol. 31, 1922, pp. 313-340.

[2] According to official Rumanian figures 20 per cent. of the export of timber and timber products in 1913 went to Egypt and 12 per cent to Turkey.

The peasant of the foothills is the representative of Ancient Roumania, but in certain parts of the same foothill region, especially in the valley of the River Prahova, Modern Roumania is equally well represented. As well as the peasant in picturesque costume making his way in leisurely manner in his creaking ox-cart, there is a mechanic in overalls tinkering with a piece of machinery. As well as the natty, brightly painted little wooden house with its verandah covered in flowers is an unsightly compound of temporary premises with derricks, rubbish-heaps, etc., all the paraphernalia of the oil wells, which are the power of Modern Roumania. In these days of motor transport oil is a much-sought commodity, of which the supply is strictly limited, and Roumania's chief claim to present world importance is based upon her oil production; she ranked fourth among the oil-producing States of the world for several years before the war.

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[1] Emmanuel de Martonne: La Valachie: Essai de monographie géographique, Paris, 1902.

### *The Basin of Transylvania.*

The Basin of Transylvania is itself at a high altitude, but it gives the impression of a basin because it is surrounded by mountains. It is broken up into a number of basins by low wooded hills. The structure of each unit consists of a worn-down basin edge surrounding a stretch of level land which has been formed by deposition in the centre of the basin. Although the underlying structure is the same, yet the proportion of level land to hill differs, the hill gaining on the plain as one journeys northward, so that the land becomes progressively more undulating.

Transylvania is one of the favoured spots of Europe. Abundance of timber, many streams, sufficient rainfall, fertile soil, and favouring aspect have combined to make it a farmers' paradise. The result is that people from the surrounding lands have been drawn to this attractive region through all periods of history, and the population is heterogeneous.[1]

Every fertile strip of land is occupied, and one passes in succession the great straggling Hungarian villages of the Szeklerland, large towns settled by the Germans with mixed population of German, Hungarian, Jew and Roumanian, and characteristic Roumanian hamlets.[2] Small sordid mining towns on the edge of the Bihar block complete the general confused impression.

Throughout the land there is evidence of long-continued successful agricultural development. Most of Transylvania may be classed as a region of increment.

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[1] On the historical aspect see paper by James Berry: Transylvania and Its Relations to Ancient Dacia and Modern Rumania, *Geogr. Journ.*, Vol. 53, 1919, pp. 129-152.

[2] *Cf.* B. C. Wallis: The Rumanians in Hungary, *Geogr. Rev.*, Vol. 6, 1918, pp. 156-171.

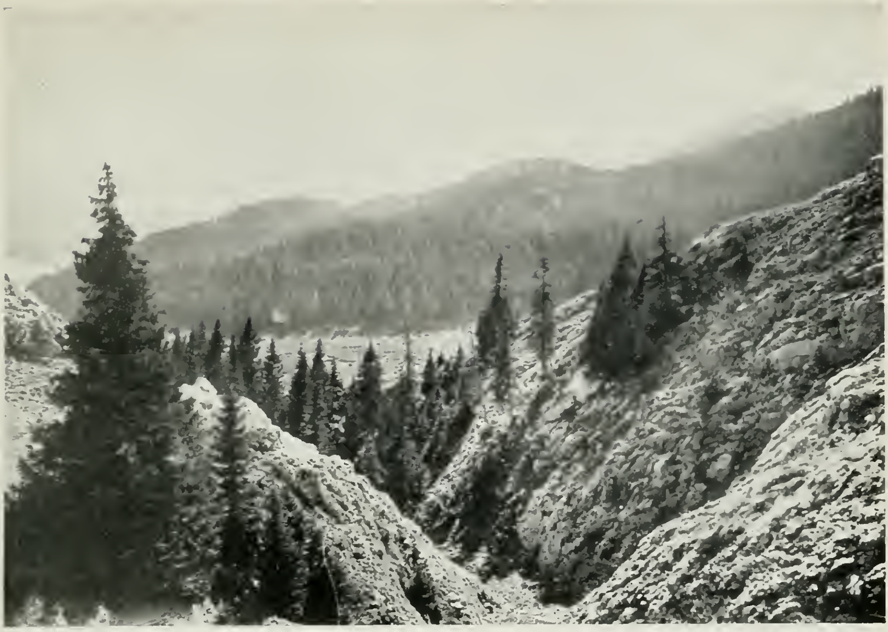

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Fig. 4.—The Jura type of relief is seen in this part of the Bucegi massif. Fig. 4 is in the upper valley of the Jalomitsa. The amphitheatre formed by the headwaters of this stream is richly wooded to high altitudes. (Photograph by M. Harret, Sinaia.)

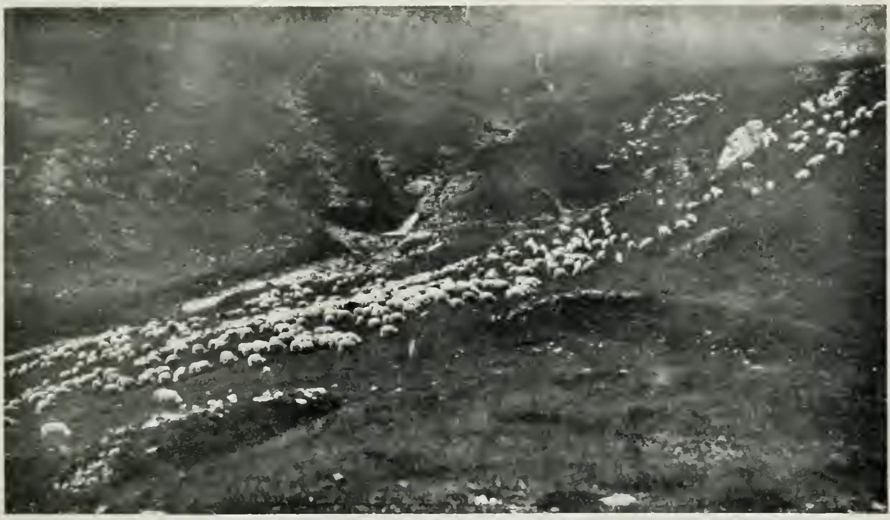

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Fig. 5.—Sheep in the Carpathians at an altitude of 7,500 feet. The Caraiman plateau, Bucegi massif. (Photograph by M. Harret, Sinaia.)

*The Plateau of Moldavia and Bessarabia.*

While Transylvania stretches to the west of the Central Mountains another region of equally moderate relief extends to the east of the mountains; this is the plateau of Moldavia and Bessarabia. In structure this plateau resembles the foothill region, but the climate is more arid (see fig. 2) and the loess-covered surface absorbs so much water that the resulting country is very different from the foothill region. As one goes eastward the woods get fewer and thinner and the valleys broader and shallower. The monotony and bareness of the steppe begins in vivid contrast to the varied wooded country of the foothills. Agriculture is exceedingly profitable in the river plains of this region, and therefore the life of the region is concentrated in these wide river valleys. The influence of Mount Athos and Byzantium is seen in the ancient monasteries of Moldavia, while to the south the ease and penetration allowed by the absence of mountains and forest is still more evident, the south of Bessarabia presenting a mosaic of population comprising Bulgars, Germans, Russians and Turks, as well as Roumanians.

*The Mountains and Plateau of the Dobrubja.*[1]

The mountains of the northern Dobrubja are probably an overthrust of the same system as the mountains of the Crimea. They have not as copious rainfall as the Carpathians, and there is not so much forest, nor is the forest of the same quality; it is not as valuable. Economically it is an unimportant region, building stone being its chief commercial product. To the south of the mountains of the northern Dobrubja is a limestone plateau with a covering of loess.[2] The region has not sufficient rain to support more than a steppe-like vegetation, and in addition the limestone and loess do not retain what moisture there is; it is therefore an unprepossessing region, and on the whole unproductive. Attempts are being made to develop agriculture, and near Constanza enough wheat is produced to export. These regions on the edge of the steppe-lands suffer exceedingly from the variability of climate from year to year, a slight reduction in the amount of rain that falls, or a slight retarding of the spring rains means ruin to the crops. The general condition of the houses in the small villages is deplorable, reflecting the difficult conditions of the country. Constanza, with its well-built houses, situated on the sparkling blue sea, with its up-to-date plant for storing and exporting the oil and grain, offers the greatest contrast to its desolate, monotonous hinterland.

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[1] "Recherches geologiques dans la Dobrogea." G. Murgoci. *Anuarul Institutului Geologic al Româiei,* Vol. VI. Bucharest, 1916.

[2] See the block diagram by G. Valsan; Campia Romanz, *Bul, Soc. Regale Romåna de Geogr.,* Vol. 36, pp. 313-568.

### *The Plains.*

To the south of the central mountains stretch the plains of the Lower Danube, which continue through Wallachia into Bessarabia. There is also a narrow strip of plain on the western edge of Transylvania called the Banat. These plains furnish the agricultural produce which is Roumania's greatest contribution to world commerce. In 1913 one-eighteenth of the total exports (counted by tonnage) was timber; this is mostly contributed by the mountain zones. Oil amounted to one-sixth; this comes from the foothill region, while the plains that give the cereals furnished no less than two-thirds of the total exports. These are pre-war figures; but Roumania, with all its additions of territory has not changed essentially,[1] and its plains are still economically its most important part.

The Plain of the Lower Danube is similar in structure from east to west, but varies in fertility. The western part has sufficient rainfall to support a natural vegetation of rich grass, and here are the endless fields of wheat and maize. As one travels eastward the land becomes more arid (fig. 2), and the vegetation for the most part is poor. Wheat-growing is profitable, for the soil is exceedingly rich, but it is a crop requiring great care and subject to fluctuations according to the variation in rainfall from year to year. A great deal of land distribution has taken place, and small farms are becoming more numerous at the expense of the large estates, but one may still see the large-scale cultivation with machinery on big estates, which recalls the Middle-West of North America. The flatness of the land and the extreme climate also suggest a parallel. These plains of the Lower Danube are a part of the Old Kingdom of Roumania, but they have not the wealth of tradition that the foothill region has. Until comparatively recent times they were hardly populated owing to the ravages of war. The character of the population is also more heterogeneous than that of the foothills.

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[1] "La Nouvelle Roumanie dans la Nouvelle Europe," E. de Martonne. *Bull. Soc. Reg. Romane de Geog.*, Tom. xl, 1921. (See p. 14.)

The bordering plains of Transylvania are exceedingly fertile, and well watered, and in addition to these natural advantages are tilled and fertilised in careful systematic fashion, the yield per acre being very high indeed. A journey through this plain gives the impression that it is far more densely populated and that there is more mixed farming than in the plains of the Lower Danube. In this region Roumania faces one of her gravest ethnic problems, the long-established alien population.

*The People of Roumania.*[1]

Such is the physical setting of human life in the several natural regions comprised within the borders of the new Roumanian State. What of the people who live within them? Roumania is at the meeting-point of the Balkans, Central Europe and the Russian plains; she is not isolated by any great natural barriers, and one of the results is that large numbers of aliens have their home in her territory. It is estimated that between 20 and 25 per cent. of the population is non-Roumanian. "Surrounding the solid block of Roumanian population in the Old Kingdom is a belt of largely mixed population. Poles, Ruthenians, Little Russians, Tartars, Turks, Bulgars, Serbs, Slovaks, Hungarians, appear in succession and overlapping as one goes round the circle. The Hungarians, know as Szeklers, form a solid group in the heart of Transylvania, and Germans are widely distributed throughout the mixed zone; Jews are most numerous in the northern part of the country and in the towns."[2]

[3]Most of the Roumanians and also the aliens are farmers living on the land either in hamlets or in villages. In 1920[4] the population was estimated to be between 16 and 17 millions,

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1. For a study of the ethnic composition of the new Rumania see Emmanuel de Martonne : " Essai de carte ethnographique des pays Roumains," *Ann. de Géorg.,* vol. 29, 1920, pp. 81-98, and also the article of the same author cited in footnote 1.

2. " The New Roumanian State," E. M. Sanders. *Geog. Review,* vol. xiii, No. 3, July, 1923.

3. La Roumanie économique, 1921, Office des Etudes et Enquêtes, Ministère de l'Industrie et du Commerce, Bucharest, 1921, p. 10.

4. The *Bul. Soc. Reg. Române de Geogr.*, vol. 39, 1920, p. 381, gives the population of Rumania as 16,262,000, distributed thus : Old Kingdom, 7,897,000; Bessarabia, 2,345,000; Bukovina, 812,000; Transylvania, 2,686,000; Crishana, 1,145,000; Maramuresh, 467,000; Banat, 910,000.

and of these 14 millions were villagers, and of town-dwellers about half were engaged in mining and manufactures. Roumanian oil bulks large in our mental picture of Roumania, but as a matter of fact it is exploited in great part by foreigners, the majority of the Roumanians are not sufficiently educated to take part in the development of this great national asset. The oil of Roumania seems so important because there are but few countries that produce oil, it is *not* the most important product of Roumania, however, even regarded from the point of view of foreign commerce. Agricultural produce forms the greater part of the exports, oil comes next, and timber a long way behind. It cannot be too strongly emphasised that Roumania is essentially an agricultural country; 75 per cent. of the people are engaged in farming or shepherding. Let us, therefore, consider the agriculture of Roumania in some detail.

Prior to 1864 Roumania had much the same system of land tenure as Russia; a few landowners held the peasantry in a state of serfdom. In 1864 the peasants were freed and the property of the monasteries was distributed among 4,000,000 peasants.[1] This was the beginning of a re-distribution of the land. At intervals since there have been measures taken to reduce the size of the large estates and to give or sell the land to peasant proprietors. Not only large estates and Crown Dominions have been divided among the peasants,[2] but also large tracts of land have been given over to peasant associations for cultivation and common pasturage. The redistribution of the land is not yet completed, but is still going on. Thus the greatest asset of the country is being handed over to the peasants, who as a rule are poorly educated, and in general ignorant of modern methods of farming. There is inevitably a falling off in production, but it is held that the gain in security to the State from this social revolution more than compensates for the loss of exportable material.[3]

[1] H. M. Conacher: "Agrarian Reform in Eastern Europe," *Internatl. Rev. of Agric. Economics,* vol. 1 (N.S.), 1923, Rome, pp.3-18; reference on p. 15.

[2] *Ibid,* pp. 24-25.

[3] G. Jonescu-Sisesti: "Agrarian Reform and Agricultural Production in Roumania," *Manchester Guardian Commercial,* "Reconstruction in Europe," 1922-23, p. 514; *idem*: "Land Reform in Roumania," *ibid,* pp. 373-375.

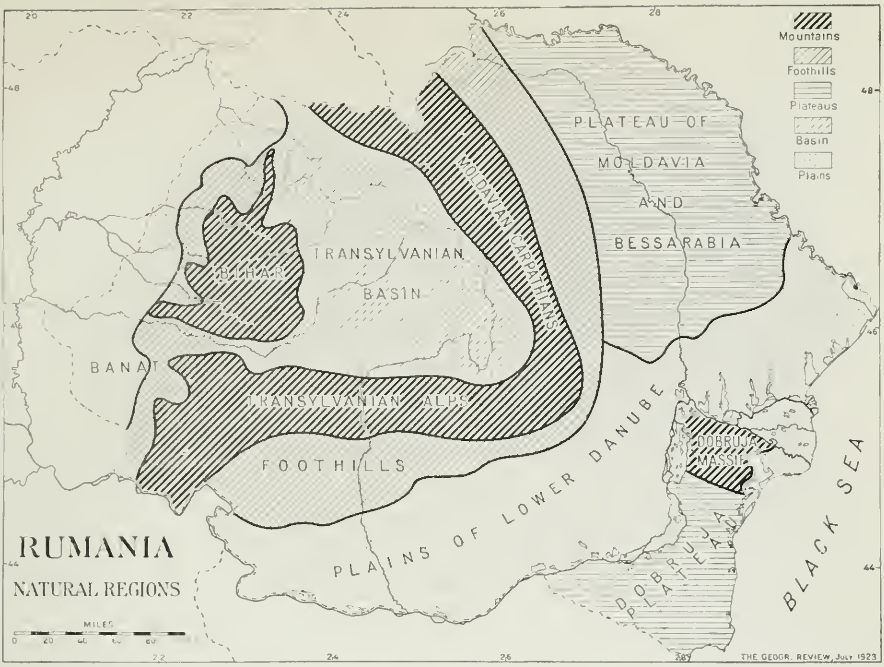

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Fig. 6.—Map showing the major natural regions of Rumania. The boundaries of the regions are drawn diagrammatically. Based on G. Murgoci and I. Popescu-Voiteshti: Carte géologique de la Roumanie et des contrées limitrophes, 1 :2,500,000; G. Murgoci and I. Popa-Burca: Harta Fizica a României, 1 :2,500,000 (accompanying Geografia României, New Ser., 3rd edit., Bucharest, 1921); E. de Martonne: Physiographic Map of the Carpathians, 1 :2,500,000, *Geogr. Rev.*, Vol. 6, 1917, Pl. IV; and other sources. Scale of map 1 :7,000,000.

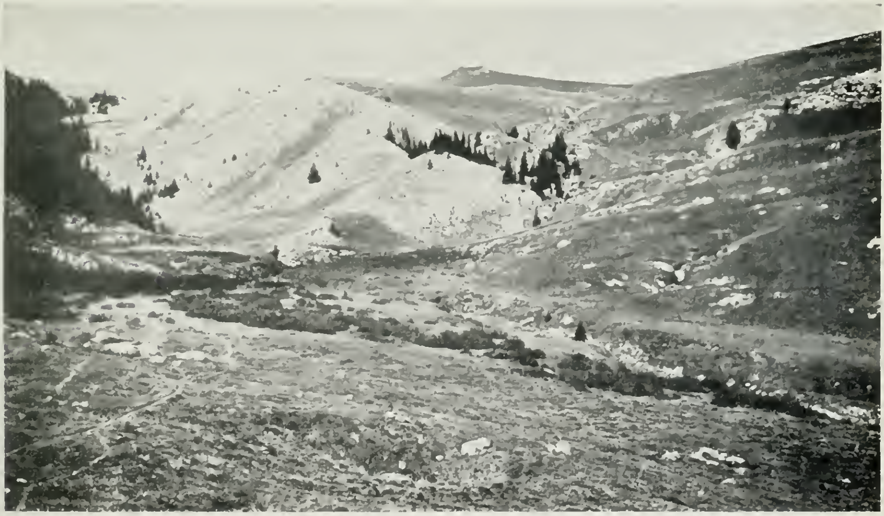

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Fig. 7.—Karst type of country in the Bucegi massif. (Photograph by M. Harret, Sinaia.)

The national food of the Roumanians is a sort of porridge made of maize, and consequently a large proportion of the arable land is under this crop. Over 3,000,000 hectares in all are estimated to be under maize, which not only furnishes the chief article of food for a large part of the people, but also provides a considerable proportion of the exports.

Of the various divisions of the country it is the plains of the Lower Danube—that is to say, Old Roumania—that have the greatest acreage of this crop, comprising about half the total acreage under maize in Roumania. In the foothill region and in Moldavia it is the chief crop also. The maize fields of the Transylvanian basin are almost as important as the maize lands of Old Roumania, occupying about one-third of the total acreage and yielding well. A very considerable area in Bessarabia is also under maize.

Wheat is as important as maize if one considers figures for production; it is the crop grown for export, and in pre-war days the great estates of the Old Kingdom furnished the greater part of the wheat exported. In the New Roumania the acreage of wheat in Transylvania, Bessarabia and Bucovina[1] must be added to that in the Old Kingdom, and the result is that it is almost doubled.[2] However, the cutting up of the large estates has caused more maize to be grown for consumption in the country itself, and less wheat to be grown for export. As far as one can judge there is a falling off in both quantity and quality of wheat exported. Many causes have gone to produce this effect besides the redistribution of the land; the ravages of war which have affected the equipment of the farms, especially the draught animals which are largely oxen on the peasants' farms; political measures which have regulated the export and price of wheat; and the fluctuations of climate are chief among these causes. It is impossible to make any more than the very general statement that the export figures for wheat have decreased compared with pre-war figures.

The total arable land of Roumania is 45 per cent. of the entire area, and of this arable area wheat and maize occupy about two-thirds. The rest is under various crops, of which barley is the most important, though oats and rye come into the same class. Much less ground is taken up with forage crops, potatoes, vineyards and orchards, although these are of value, while tobacco is the "luxury crop" of the peasant.

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[1] " La Nouvelle Roumanie dans la Nouvelle Europe. E. de Mortonne. *Buletinul Societatii Regale Romane de Geographie,* Tomul xl, 1921.

[2] Emmanuel de Martonne : " La Transylvanie," *Bull. Soc. de Géogr. de Lille,* vol. 64, 1922, pp. 93—102; reference on p. 98.

As important as the acreage under the different crops is the yield per acre. This varies greatly in different parts. Where primitive agriculture prevails the yield is small. Where modern methods of farming are carried on the average yield is high. Such a region is the Banat, where chemical fertilisers are systematically used. On the great plains of Roumania the yield in favourable years is high, although the erratic rainfall diminishes the actual yield. In different parts of Roumania the methods of farming vary so much that a history of the development of agriculture might be written and illustrated by photographs of the farmers at work in different parts of Roumania. The most backward are the Ruthenian peasantry in the north of Bessarabia, the primitive wooden plough and flail having survived there to the present day. The self-supporting small farms of the Roumanian hamlets of the foothills furnish excellent examples of mixed farming on primitive lines, adapted excellently to take advantage of the opportunities offered by the country. The large Hungarian and German farms of Transylvania are generally well managed, mixed farming on a small scale being the rule. The large estates of the plains of Old Roumania have furnished proof of the wonderful utility of machinery in dealing with large areas of plain and in combating the loss due to the variable climatic conditions. Already the peasant co-operative societies have a system of lending certain agricultural machines, and it is to be hoped that co-operation and mutual insurance may help the small landowners to improve their farming methods and to tide over difficult times.

The plains bordering on Hungary employ a technique of production for the most part in advance of the methods in vogue in the Old Kingdom.[1] Animals, hides, skins, wool and hair all figure in the list of exports; but compared with grain they are unimportant. Domestic animals, however, are not wanting; ox-carts on the roads, herds of pigs, and large groups of oxen are everywhere to be seen in Transylvania and the hills of the Old Kingdom, while the steppes of Bessarabia have numbers of horses. The flanks of the Carpathians feed immense flocks of sheep. The oxen in the peasant farms are the draught animals; the pigs are reared for eating, but the peasants have a very small proportion of the meat; it goes to feed the town people. The sheep are useful to the peasants, for they give wool, which is woven at home, and sheep-skin, which makes garments. The milk is made into a kind of cheese. The animal industries have received a stimulus from the growth of the towns consequent upon the recent development of the oil industry and all the transport, etc., that it involves. Transylvania has more stock-raising and sheep-rearing than any other part, the hilly regions of the Old Kingdom are not far behind, while Bessarabia is the horse-rearing province. The Banat and the Bukovina rear quantities of pigs in connection with the maize-growing and the oak-woods.

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[1] "The Agrarian Revolution in Roumania," T. L. Evans. *Cambridge Univ. Press,* 1924.

*Forests.*

The natural vegetation of the land, unhelped by man, provides pastures on the mountains and the meadow-land in the valley bottoms, and on the mountains extensive forests. There is woodland also on both the hills and plains wherever there is sufficient rainfall. Even a superficial examination of the houses, domestic utensils and the numberless decorated articles of the Roumanian peasants show that wood has played an important rôle in the development of Roumanian culture. As important a part as it played in the settlement of the land, the absence of wood on the plains was probably one of the factors delaying settlement there.[1] The proportion of woodland is increased by the inclusion of Transylvania and Bucovina within the boundaries of Roumania. Formerly forest occupied only one-fifth of the total area, now it is increased by some 5 per cent. The peasant industries continue as of old, working up the wood into many objects of art, while side by side with them is the newer method of exploiting the forests by aerial railways and railroads.

*Fishing.*

Another source of natural wealth is the fisheries of the Danube. The river follows a braided course in its lower parts, the stretch of river-channels, islands, and marshes is from 10 to 11 miles wide, and here the fishermen ply their trade.

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[1] E. de Martonne, article cited in footnote 1, p. 23.

### *Mineral Wealth.*

The mineral wealth of Roumania includes petroleum, coal, iron, natural gas, gold, salt, copper and manganese. The most important by far is petroleum. It is found in the foothills region in the Tertiary rocks. One oil-field surpasses all the others. This is the Prahova field, of which Ploesti is the centre; it produced over 80 per cent. of the total oil produced in 1922.[1] A minor oil-field to the west of the Prahova field has Dambovitza as its centre, while to the east is the Buzau oil-field. Further north in Moldavia is the Bacau oil-field.[2] Expensive machinery is needed to exploit the oil, and post-war production has been reduced because of the damage done to the mines as well as the disorganisation of the railways and many other conditions due to the war damage. The industry is, however, recovering, as the returns of the last few years indicate.

Natural gas is found in appreciable quantities in Transylvania, coal and lignite in Old Roumania and Transylvania provide about 4,000,000 tons a year, and useful if not extensive deposits of iron-ore are worked in Transylvania. Roumanian salt has been exploited since Roman times. The importance of these minor minerals must not be exaggerated, but they provide some of the most important materials for the experimental stage of manufacturing. Other conditions favourable for the development of manufacturing are also present—i.e., easy intercommunication between the various natural regions which in themselves provide a large amount of raw material which could be made more valuable for export if it were worked up, and an agricultural population which could supply labour. Add to this the advantage of through routes of international railways and both river and sea communication, and the opportunities of Roumanian industry are seen to be great. At the present time the most important of these routes leading to the outside world is the sea; by far the greater part of the commerce is carried round to Western Europe by way of the Black Sea

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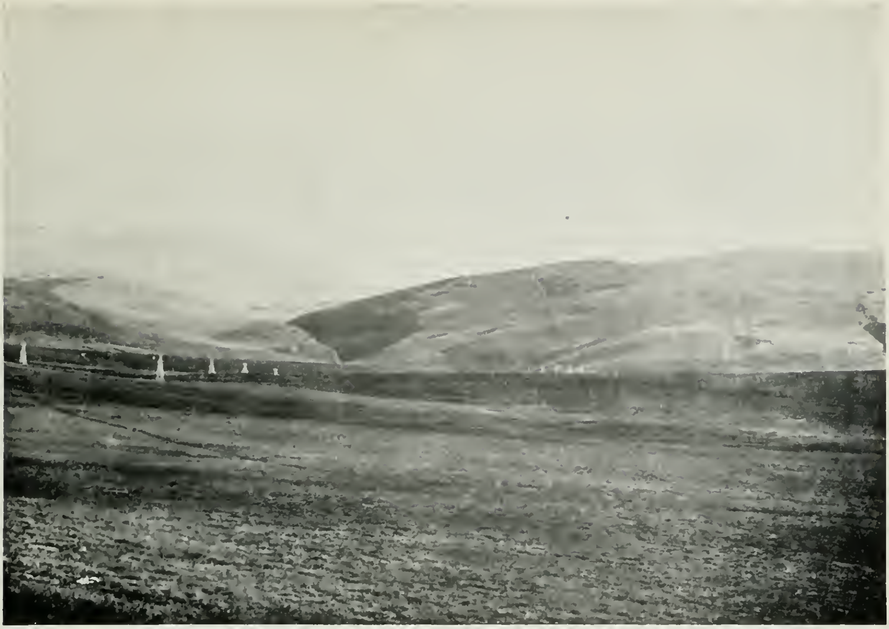
[1] *Correspondence Economique,* Fourth Year, No. 13, June, 1922, Bucharest, p. 24.

[2] L. Mrazec: "Compte Rendu Congrès Internatl. du Petrole," 1907.



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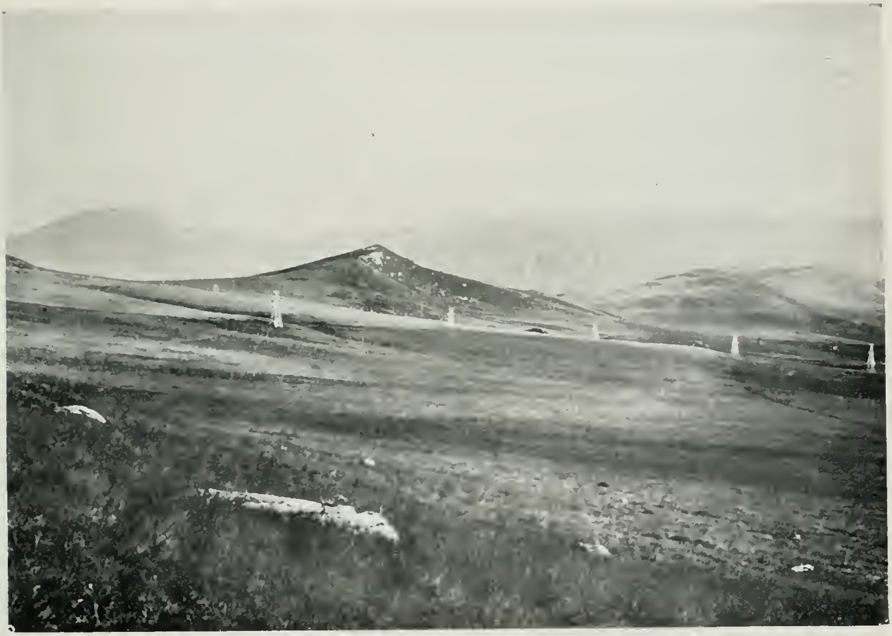

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Figs. 8 and 9.—Plateau-like summits in the Bucegi massif. Note the aerial railway for carrying down timber. The Bucegi massif, lying between the Dambovitsa and Prahova valleys, is a transition region between the Transylvanian Alps and the Moldavian Carpathians. It is especially interesting for the highly varied forms of relief exhibited. (Photographs by M. Hariet, Sinaia.)

and Mediterranean; the Danube is comparatively little used, the exports, being very bulky, would have to be pulled against the current, and the lands served by the Danube produce just those things (with the exception of oil) which Roumania has to offer and there is little demand for them in consequence.

*Trade.*

The present state of foreign commerce[1] reflects well the state of development of the country. Grain and other agricultural products, together with oil and timber, are exported, and in return metal goods, and machinery for the oil-wells, mines and railways are imported. Of the other imports, textiles, of the more useful materials—cotton and cotton-yarn and cotton cloths for clothes—are the most important. The most striking feature of the import figures is the small proportion of foreign foodstuffs, sugar, coffee and tea, etc.; the peasants are practically self-supporting, and need these "luxury foods" as little as they need the "luxury textiles," silk, linen, etc. Another striking absence in the import-list of Roumania is that of raw materials. Manufacturing is in its infancy and works upon the materials produced on the spot.

Commerce is developing, and is bound to continue to do so. The oil industry brings much in its train and stimulates the domestic commerce, which inevitably goes on, in a country where the regions differ so much. The addition of Transylvania also means an immense gain commercially to the Old Roumania.

*Outlook.*

Roumania suffered severely in the war, and it will take long to recover from war and "post-war conditions." She has many exceedingly difficult problems to face. One of the most delicate is the handling of the alien element in the population. Another serious problem is the organisation of national education to fit her people to take their part in the development of the resources of the land.[2] The Budget shows that this is being attended to, and the opportunities offered by the universities (Bucharest, Jassy, Cluj, Cernowitz) and the technical institutes promise well. The fact that Russia, in the throes of Bolshevism, is a near neighbour creates a difficult position which the distribution of the land among the peasants has done much to improve. It is to be hoped that the development of Roumania will not be forced; it takes a long while for a peasant State to bring itself up-to-date, and any forcing of the process must result in loss of individuality. If the characteristic Roumanian culture of the peasants of the foothills were to be lost, instead of developing along its own lines under the new conditions, it would be a loss to the world.

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[1] See Clive Day: "The Pre-War Commerce and the Commercial Approaches of the Balkan Peninsula," *Geogr. Rev.*, vol. 9, 1920, pp. 277—298. The last really normal commercial year for the Balkan countries and Rumania is 1911, *i.e.*, before the Balkan Wars.

[2] Aristide Blank: "The Public Finances of Rumania," *Manchester Guardian Commercial*, "Reconstruction in Europe," 1922-23, pp. 292—295.

# THE GEOGRAPHICAL POSITION OF THE BRITISH EMPIRE.

By Vaughan Cornish, D.Sc.

(The Presidential Address delivered to the Geographical Section [E] at the Liverpool Meeting of the British Association for the Advancement of Science, 1923.)

## Part I.—The Position which has Been Occupied.

The British Empire, although situated in every continent, with shores on all the oceans, is seen to have a definite geographical position when we consider the ports of call which unite its lands and the naval stations which guard the communications. During the growth of the Empire eastward and westward from Great Britain, numerous harbours were held at different times, those retained being a selection unrivalled by the ports of any other State in commercial and strategic position. Our many oceanic islands give us, moreover, an important advantage in the selection of maritime stations for aircraft.

The naval station of Bermuda, well withdrawn from aerial attack, has a central position in the great western embayment of North America intermediate between the ocean routes which connect Great Britain with Canada and the West Indies. No foreign ports flank the route between Canada and the west coast of Great Britain. At the western gateway of the South Atlantic we have excellent harbourage in the Falkland Isles. Malta, the capital of our Fleet in the Mediterranean, has a commanding position at the Straits which connect the eastern and western basins, and the naval station at Gibraltar helps to ensure the junction of the Home and Mediterranean Fleet and to protect the Cape route. Our status in the Sudan, the vulnerable frontier of Egypt, is still maintained, and the British army which is kept in Egypt as garrison of the Suez Canal ensures our use of this gateway as long as we can navigate the Mediterranean. If that navigation be interrupted we can still oppose the seizure of the Isthmus, for we are able to send reinforcements by way of the Red Sea. East of

Egypt the British island of Perim stands in the Straits of Bab-el-Mandeb, and the garrisoned fuelling station of Aden provides the necessary port of call on the routes to Bombay and Colombo. Colombo, in the Crown Colony of Ceylon, is at the parting of the ways for Australia and the furthest parts of our Asiatic possessions, and Singapore stands at the narrow gateway of the shortest route between India and the Far East.

The Cape route to India and Australasia is improved by British ports of call in Sierra Leone, St. Helena, and Mauritius, and is more effectively dominated from British South Africa than at first appears, for although there is open sea to the south there are no useful harbours in the Antarctic continent, and on the African coasts the harbours are under British control for a thousand miles from Cape Town.

Of the six great foreign Powers the French alone are posted on the flank of both routes between Great Britain and the Indian Ocean, and no Great Power has its home territory on that ocean, or railway connection thereto from its home territory.

Thus the principal lands of the British Empire—Canada, the British Isles, South Africa, India, and Australasia—have good communications with one another across the Atlantic and Indian Oceans both in peace and war.

The conditions of strategic communication across the North Pacific, on the contrary, are adverse to us, owing mainly to the circumstance that we opened up British Columbia across the prairies and by the coasting voyage. Had our colonising route been across the Pacific, the Hawaiian Islands, which were first brought into touch with the Western world by the ships of the Royal Navy, would have been a British settlement and one of our first-class naval stations. As things happened, however, these islands were first needed by the Americans, and now form the essential western outpost of the United States Navy. Between them and British Columbia the ocean is empty of islands, and Fanning Island, south-west of Hawaii, with the adjacent small coral islands in our possession, are no adequate substitute, even apart from overshadowing by a first-class naval station in the neighbourhood. Thus there is no good strategic communication between Australasia and Canada across the North Pacific. In this connection it must be remembered that cousinship does not relieve the American

Government from the obligations which international law imposes upon neutrals. It was not until three years after the outbreak of the Great War that America could offer us any facilities in the harbour of Honolulu which were not equally open to Germans. It must also be noticed that we have no control of the Panama route between New Zealand and Great Britain.

Turning to the question of communication between British Columbia and India, it is important to realise that the Pacific coasts of North America and Asia are in direct line with one another, forming part of a Great Circle, so that there is no short cut across the ocean, as the map misleadingly suggests. Thus the course between Vancouver and Hong Kong is not only very long, but also closely flanked by the home ports of Japan and many outlying Japanese islands, so that its security in time of war depends upon the attitude of the Japanese.

When, therefore, we differentiate the routes on which we have well-placed naval stations and recruiting bases from those dominated by the ports of some other Great Power, we see that the lands of the Empire are united by the Atlantic and Indian Oceans and strategically separated by the North Pacific. Thus the form in which the Mercator map is usually drawn by British cartographers with Canada in the upper left and Australasia in the lower right corner, is a good representation of our maritime Empire. It shows the lands as connected by the Atlantic and the Indian, but not by the Pacific Ocean; Great Britain, the naval and military headquarters of the Empire, on the central meridian; and Port Said and Cape Town as connecting positions between the western and eastern parts of the Empire.

Upon this map a symmetrical distribution of our lands is revealed when a Great Circle is drawn connecting Halifax, in Nova Scotia, the eastern terminal port of the Canadian Pacific Railway, with Fremantle, the western terminal port of the Australian railway system. This truly direct line, twisted on Mercator's map into the form of the letter S, extends just half-way round the meridians, but is somewhat shorter than the semi-circumference of the globe, the difference of latitude between Halifax N.S., and Fremantle being less than ninety degrees. The line passes through Lower Egypt close to the Suez Canal, following the general direction of the Main Track of the Empire, which is the steaming route from Canada to Great Britain, and thence by the Suez Canal to India and Australia. At one end of the line lies the Canadian Dominion, and at the other Australasia, to the north the British Isles, and to the south the Union of South Africa, the chief homes of the British nation. Our coloured peoples are also distributed symmetrically about the line, India being on the east, the Crown Colonies and the Protectorates of Africa on the west, so that it is the axis of symmetry of the Empire. Not far from its middle point is the Isthmus of Suez, where our direct line of sea communication is crossed by the only continuous route for the international railways which will connect our Indian and African possessions, and adjacent to the Isthmus is the central station of our airways.

Such is the form and position of the British Empire, regarded as a maritime organisation, which in fact it is.

The Empire thus mapped has an Intermediate Position among the commercial, national, religious, and racial communities of the world such as is occupied by no other State. The ocean routes must always be the link between the two great land areas of the world, and in the present state of land communication provide the connection between the numerous independent systems of continental railways. The chief of these systems is based on the ports of Continental Europe, of which the greatest communicate with the ocean, and therefore with other railway systems, by way of the English Channel. Thus the island of Great Britain is intermediate between the principal termini of the European railways and other railway systems. Its harbourage is unequalled by that of any country of Continental Europe, and its supply of shipbuilding material and coal exceptionally good. Thus the physical characters of the island accord with its position on the commercial map, and the Metropolitan British in their Intermediate Position have become the chief common carriers of international commerce. Much of this profitable business used to be in the hands of smaller European States, whose commerce eventually suffered from their inability to defend themselves against more powerful neighbours. Our merchant shipping is protected by the Royal Navy, but owing to the recent development of fighting aircraft, ships of war can no longer protect the island itself, and since the close of the recent war this citadel of the Empire, the home of two-thirds of the white population, has been more exposed to attack from the Continent than at any previous time during the last eight hundred years.

The Suez Canal, where we have the principal control, is the gateway between the railway termini of Europe, the greatest manufacturing centre of the world, and those of the monsoon region of Asia, the greatest centre of population. It is also on the shortest route between the railways of North America and India.

The commercial and strategic importance of Singapore as an Intermediate Position between India and the Far East is enhanced by the circumstance that railway communication between them is debarred by the greatest mountain system in the world.

Hong Kong, at the chief gateway of Southern China, is typical of British maritime stations both in its Intermediate Position and in the facilities provided for the ships of other nations, which swell the vast tonnage entered and cleared at the port.

How far-reaching is the effect of our Intermediate Position is revealed by the important but little recognised fact that it is the British naval station which would, if available, provide America with the best line for reinforcement of the Philippines, the Achilles' heel of the Republic. The distance of Manila from the naval shipbuilding yards of the United States is almost exactly the same by Suez and Panama, but the Pacific connection has never been good owing to the great distance between stations, and is now worse than before the Great War on account of the island mandates acquired by the Japanese. The relation of Port Said and Singapore to America and the Philippines is only one of many cases in which our position is intermediate between the home and Colonial possessions of a white nation. Thus the important French possession of Indo-China has to be reached from France either by way of the Suez Canal, where we maintain a garrison, or by rounding the Cape, where we have a national recruiting base, as well as a station of the Royal Navy. The true significance of our Intermediate Position has, however, been generally missed owing to a one-sided interpretation of strategical geography. An intermediate station, particularly a naval station, has commonly been regarded as a blocking position, a barrier where freedom of movement can be interfered with. The historical fact is, however, that the harbours of the British Empire have also been a link between nations. In the Great War the British Empire was the link of the Allied and Associated Powers, and its geographical position is unequalled for making a benevolent alliance effective or checkmating the action of an alliance formed with a sinister purpose.

The British Empire provides in Canada the one link between the European and American divisions of the white race, for public opinion in the United States adheres to the view that the New World, in the sense of North and South America, should be shut off and sheltered from the evils of a bad Old Europe.

In Tropical Australia the British, in the exercise of their discretion, have set up a Barrier between the white and coloured races. Australia is a land almost empty of aboriginals, which has for the most part a climate in which British children thrive and develop true to type. In the great basin of the Murray River and its confluents, not far from the huge superficial deposit of brown coal in South Victoria, is a combination of fertile soil, forcing sun, water for irrigation and cheap electric power transmitted from the coalfield. This favoured region, the "Heart of Australia," as it has been called, with a population of only three million, is equal in size to France, Italy, and Germany combined, which have a population of more than one hundred and thirty million. The problem of Australian settlement is, however, complicated by the circumstance that the northern coast-lands lie in the Tropics, and have a climate which makes field work very arduous to white men. It is, moreover, uncertain if British families would continue true to ancestral type in this climate. If, however, settlers from the neighbouring monsoon lands of Asia be admitted, whose descendants would rapidly increase, it would be impossible to maintain a colour line between Tropical and Temperate Australia, and the rough labour of the Commonwealth would in time be done by coloured people. The fact that this labour is cheap would result in the employment of a great number of coolies instead of the use of machinery, and Australia might become a land of coloured workmen and white overseers. Circumstances, therefore, forced the Australians to decide whether their tropical belt should be a Link or a Barrier between white and coloured labour. The decision to erect a Barrier was taken early, and has been consistently maintained. The strategic responsibility of the decision is seen to be very great when we look into the future and reflect on the facts of population.

Of the 1,650 million people in the world, the whites number about 500 and the coloured 1,150. The former are mainly grouped on the two sides of the North Atlantic Ocean; of the latter, the greater part, about 800 million, are in the monsoon region of Asia, which includes India, Indo-China, China proper, and Japan. The Australian British are far from the main body of the white race and from Great Britain, the chief recruiting base of their own nation. On the other hand, the distance by sea between Townsville, Queensland, and the Japanese coast is no longer than the course of the coasting steamers from Fremantle to Townsville; and the other lands of Monsoon Asia are even nearer than Japan.

Enough is known of the relation between geographical environment and national well-being to declare with confidence that the decision to erect a Barrier against coloured labour in Tropical Australia is best both for the white race in Australia and for the coloured people of the monsoon region of Asia. Not only is Government much more difficult with a two-colour population, but the admission of coolie labour would deteriorate the national character of the Australians, for history shows that the greatest nations are those which provide their own working class. Turning from the Occidental to the broader humanitarian view, it is only necessary to look ahead in order to see that the admission of Asiatic coolies to a British homeland is unkind to their descendants. Those that remain unmixed in race will have a stunted existence as a community cut off from full national life, whilst the case of mulatto descendants is almost worse, for the children are not brought up in the family of the British parent, and yet are cut off from the full tradition of Asiatic civilisation. Far better, then, that the Asiatic coolie should remain where the family life of his descendants will be part and parcel of national life.

Neither should it be assumed that there is not room in Asia for a large additional population. The pressure of population in China is largely due to the undeveloped condition of mining, factories, and communications. The coalfields are unsurpassed in the world, and iron ore is abundant; if they were worked, and factories were based upon them, the new occupations and improved market for agricultural produce would provide at home for many of those who now migrate oversea. The rise in standard of living which may be expected to follow industrial development would also reduce coolie competition in the white borderlands of the Pacific. The further development of manufacture in India would operate in the same direction. The growth of a manufacturing population in China and India would stimulate cultivation and stock-rearing in the sparsely inhabited region under Asiatic rule which runs diagonally across the meridians from the Persian Gulf to the Amur, and includes the eastern provinces of Persia at the one end and Mongolia and Manchuria at the other. This has for the most part a light rainfall, but comprises much fine prairie country and some good agricultural land, whilst in the more arid tracts there are many great rivers fed from snow-fields and glaciers which could be made to irrigate large areas where the sun is as strong as in Australia. Adjacent to the Indo-Chinese peninsula are the East Indies, whose climate is suited both to Indians and Chinese, with great tracts of undeveloped land whose productivity is attested by luxuriant forest. The sparsely peopled regions of Asia near to India, China, and Japan by land and sea, and for the most part connected with them by ties of civilisation, provide an area for the overflow from these countries which is more than twice as large as Tropical Australia and British Columbia, together with California, Washington, and Oregon, the American frontier provinces of English-speaking labour.

India includes one of the most important borderlands within the Orient, that of the Mohammedan and Hindu worlds. The Punjab, with its great rivers and plain, is in such striking contrast to the mountains and plateau of Iran that we are apt to lose sight of the fact that, climatically, it more resembles the highland on the west than the rainy valley of the Ganges on the east. It is an eastern borderland of Islam, a religious world which is mainly comprised in the belt of dry country which stretches diagonally from the Atlantic shore of Morocco to the Altai Mountains. Delhi, under the Great Moghul, was an advanced capital of the Mohammedan world just within the Ganges valley, which is the headquarters of Hinduism. In this sub-imperial capital the two antagonistic civilisations are now linked to the government of the United Kingdom, and the age-long wars beween them have ceased.

Up to the time of British predominance, India was the terminal position of Continental conquerors unused to the sea, who did not develop the advantages of a salient maritime position. The ports of India lie conveniently for a long stretch of coast-land on the great gulf which forms the Indian Ocean, and now, owing to the facilities provided by British shipping, much of this coast-land has easier communication with India than with its own continental interior. Several British possessions in parts of Africa adjacent to the Indian Ocean are in the Intermediate Position between the principal homelands of the black peoples and the overflowing population of India, and nowhere has the responsibility of our Intermediate Position called for more careful examination of the rights and interests of competing coloured races. The decision with reference to Kenya which has just been given by the home Government recognises the main physical regions in the coloured world as political divisions of the Empire within which the established races have special rights.

The Union of South Africa is the racial home of white men and of the more numerous coloured people who are indigenous to the country. It is, therefore, largely a land of white overseers and coloured labour; but here, as in the other Britains beyond the seas, there is an opposition to the introduction of coloured blood into white families which is not met with where Latin races are similarly situated. The Dutch families are at one with those of British stock in the maintenance of this racial Barrier.

From the foregoing facts it is clear that the British people, Metropolitan and Colonial,[1] are in a greater degree than any other nation the doorkeepers of the world in respect of economic, strategic, and racial communications.

## PART II.—THE CONSOLIDATION OF THE POSITION.

The consolidation of the position which the British Nation has won turns upon the future of colonisation within the Empire. We must therefore compare the number of the

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[1] The introduction of the term 'Dominion' served to suggest emancipation from the Colonial Office, but the word Colonial as descriptive of a people has permanent historical value and therefore should not be allowed to lapse.

Metropolitan and Colonial British with that of other peoples within and without the Empire, and take account of the relation between the present population of the world and the area of its empty lands. The British Empire comprises the fourth part of mankind, but the ratio of white to coloured people in the Empire is only about one to six. The former are mostly of British stock, and belong to the Christian world. The latter are of many stocks, differing physically from each other as much as from the white people, and belonging to diverse religions. Their population is steadily increasing under British rule, and some of them have recently made advances in political organisation and industrial efficiency. Consequently, if the Empire is to be guided by the British, the numbers of our race must also increase. There is, however, a school of thought which considers that if our ideals of ethics and efficiency are once accepted by the coloured peoples, the racial complexion of the Empire will be unimportant, as public affairs will be regulated by our principles. This point of view, which may be termed in a general sense the missionary standpoint, does not take account of the contingency that British ideals implanted in coloured stock may receive alien development in future generations owing to biological causes. Our confidence in Western culture in general, and the British version of that culture in particular, is based more upon the power of adaptation which it has shown in our hands since the Renaissance and the Era of Oceanic discovery than upon any system of which we can hand over a written prescription. It is only in our own national communities, mainly composed of British stock, with minorities nearly akin, that we can be confident that British ideals will develop typically in the way of natural evolution. Therefore in our own interests and in that of the coloured races (who conflict among themselves) it is desirable to maintain the present proportion of the British stock, to whom the Empire owes the just administration of law and a progressive physical science.

The co-operation of the Union of South Africa in the Great War only became possible after the failure of an insurrection by part of the Boers. Since the number of persons of Dutch and British stock is about equal, an influx of British colonists is required in order to ensure unanimity between South Africa and the rest of the Empire.

Passing to the ratios between British population and foreign nations, we have to note that the population of Australia stands to that of Japan as about one to ten. The Japanese are a patriotic as well as an advanced nation, and claim equality with the white nations from patriotic motives. It is evident, therefore, that a strong reinforcement of British population is needed to maintain the doctrine of a white Australia. For the same reason New Zealand also needs reinforcements, since Australasia is strategically one.

The number and density of the population of Canada is exceeded in the proportion of about ten to one by the white population of the United States, hence it is inevitable that there should be a large flow of people from the latter country to the Dominion. As it is essential to unanimity in the Empire that the Canadians should continue to be British in sentiment and not become pan-American, a large immigration from Great Britain is required in Canada. Moreover, the population of Continental Europe outnumbers that of Great Britain[1] in the proportion of something like ten to one, and as emigrants go to Canada from many European countries there is a further call for British immigrants to maintain the British character of the Dominion.

We have next to note that the population of Great Britain, which is now forty-three million, outnumbers the combined population of Canada, Newfoundland, South Africa, Australia, and New Zealand in the proportion of two and a half to one, and increases more rapidly than that of all these Dominions, more than three and a half million being added in the decade 1901-11, in spite of an emigration which much exceeded the immigration. Thus the chief source available for the British peopling of the Dominions is the Metropolitan, not the Colonial, population.

In 1891 the late Mr. E. G. Ravenstein calculated from the rate of increase of population the time which remained before the unoccupied lands of the world would be settled and developed in accordance with their agricultural capabilities. This period he reckoned at about two centuries, by which time the population was calculated at 6,000,000,000, instead of the 1,600,000,000 which it had reached in 1891. The figure must not be taken to indicate the final population of the world, about which we know nothing, but the epoch marks finality of a certain kind—namely, the end of the colonising period of history as colonising has hitherto been conducted. The world will then be completely parcelled out among the nations, and since it is very difficult to displace a nation, it is probable that those which occupy the world at the end of the colonising period will remain in possession for a long time, even as time is reckoned in the pages of history. If we allow a generation for the setback of the War, we may roughly reckon our zero-time as 1923 instead of 1891, which, on the basis of Mr. Ravenstein's figures, would still give about two centuries, or six generations, in which to provide the temperate climates of the British Empire with a sufficiency of British stock to ensure the continuance of their British character.

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[1] In the present condition of home affairs in Ireland it seems best to leave its population out of the numerical reckoning for Imperial purposes.

There is, however, a school of thought which sees the salvation of the home country in a reduction of its population. I take their strategic argument first. It is contended that Great Britain would be safer in time of war if it had no more people than its farms can feed. Judging by France and the former Austro-Hungarian Monarchy, this would be about one-half of our present population, for our country is small though fertile. The conditions of our strategic security have, however, undergone a great change since 1914. The best plan of campaign for a combination of European Powers bent on overthrowing the citadel of the Empire would be an attack by combined air-fleets, which could be concentrated on London, the great manufacturing towns, and the shipbuilding yards, wholly destroying them one by one by intensive bombardment. This plan would be more effective than naval blockade, which it is very difficult to make complete, and is liable to bring in new belligerents owing to interference with neutral shipping. In order to have strategic security in this island we must therefore be able to meet the air-force of a European combination as well as carry out our traditional plan of despatching a powerful expeditionary force for the support of a friendly Power. This active defence requires large population and high development of technical industries, and therefore could not be sustained by a rural Britain.

The economic argument for reduced population has received ready but uncritical assent owing to the great want of employment since the War. It is stated that this island will never be able to support in proper comfort a population of forty-three million, the present figure. But the population which can be sustained in a country depends jointly upon internal resources and geographical position. The commercial position of Great Britain is more favourable than that of any other island of equal size, and the large amount of good coal, besides iron ore and beds of salt, enable full advantage to be taken of the geographical position in manufacturing for export. According to the estimate made in 1905 the stock of accessible coal in the United Kingdom is sufficient to last more than four hundred years at the present rate of output, and an estimate made in 1915 gives a yet larger stock. Moreover, no change in the distribution of available minerals can ever do away with the commercial advantage conferred by our central and focal position on the natural maritime routes. Hence the population which can be supported in Great Britain depends upon services to outside nations to a much greater extent than in most countries.

The population which can be maintained in our home country depends, therefore, to an exceptional degree upon the population and prosperity of the rest of the world, so that when the world again gets into its stride there should be improved conditions here, and as the population of the world grows so should the number of jobs in the country increase. There is, therefore, no sufficient ground for stating that we have passed or reached the limit of population which the island can ever support.

The teaching of those who advocate reduction of population as the salvation of Great Britain includes eugenic and ethical arguments. Thus it is said that very small families conduce to a high standard of civilisation since more care can be devoted to the child. This, however, leaves out of account the educative influence of the children of a family upon one another. Everyone knows that an only child is at a disadvantage in life. The world being of both sexes, and the society in which we move mainly of our own generation, the full home training for life is only obtained if each child have a brother and sister, which implies a family of at least four.

The desirability of birth-restriction among the poorer classes is strongly pressed on the plea that we are breeding to an increasing extent from inferior stock, and thereby lowering the national type. As far as the allegation relates to defectives, it is indisputable that most of them are among the poorest of the poor, and that their breeding is an injury to the community, as is also the admission of defective or criminal aliens, but these are categories quite apart from our great working-class community.

The professional families are far too few to maintain the supply of original genius needed for this country's advance, for genius is largely in the nature of a sport, and has to be replenished from a very large reservoir of population. To recruit the professions entirely from the present professional families would, therefore, in the long run be fatal to originality. On the other side of the picture, a working-class home is the best preparatory school for the colonial frontier, where to have few wants is better than the possession of many attainments.

We are told that an increase of population in Great Britain will pack the slums and thereby reduce us to the "C3" category of physique, but this argument takes too little account of the redistribution of urban population which has been going on for the last forty years. The density of population in central London has diminished, and factories have sprung up along the railways which radiate from the town. In 1911 the five Counties surrounding London, with their two included County Boroughs, contained no less than one million residents born in London who had migrated into these more rural districts. Migration, it should be observed, whether to or from the town, prevents the close breeding which used to be a serious disgenic factor in villages.

In 1911 the birth-rate in the towns of England and Wales was higher than in the rural areas, and the Registrar-General's Report states that even when these figures are corrected for the movement of the people the rural districts would only have increased at the same rate as the country at large, adding that "these facts are worth noting in view of the assumption, sometimes loosely made, that the population of the towns would cease to increase if it were not recruited from the country." In this connection it should also be noted that the proportion of London residents who are London-born has steadily increased from 1881 onwards.

The growth of our towns is no longer haphazard, but has entered on the stage of planning.

A great abatement of the contamination of town air by smoke has been shown to be practicable, and it is largely in the matter of smoke and crowding that towns have been hygienically inferior to the country, for country cottages are often as bad in themselves as slum houses, and their water supply much inferior. Moreover, the hygiene of towns has always been dependent on the circumstance that here the health of many people is affected by the carelessness of a few, and it follows that the hygienic conditions of urban life are capable of immense improvement when scientific knowledge becomes general. The experience of the War has shown that the popular notion of the inferior moral of townsmen was unduly pessimistic, for our urban regiments not only showed intelligence, but exhibited a sustained valour which has seldom been surpassed in the long annals of military history.

That emigration to the Dominions brings some economic benefit to the home country cannot be gainsaid, for trade returns show that an emigrant to the Dominions buys as much here as eleven emigrants to the United States, and therefore as much as many foreigners; but those who fear additions to our people also fear the moral effects of emigration. They say that emigration will take the best and leave the worst, and so produce a disgenic effect in the home country. But the individual emigration of to-day differs in this respert from the group migrations under political compulsion, or for conscience' sake, which inflicted eugenic loss upon Spain, France, and England in bygone days. The best lad for the Dominions is not necessarily the best for the home country, and an Empire which comprises urban as well as rural States requires young men whose business tenacity is sufficient to resist the restlessness of youth not less than those who are instinct with the spirit of the frontiersman.

That a relative increase of female migration would benefit national character cannot be gainsaid, for at present the Dominion frontiers lack the due weight of feminine influence, whilst in Great Britain many women are denied the full development of their character which some natures only attain by wedlock and motherhood. The Census of 1911, unaffected by War losses, shows an excess of about 1,300,000 females in Great Britain and a deficiency of about 750,000 in the Dominions. The inequality of distribution as between Great Britain and the Dominions limits the possible marriage-rate, and therefore the total births, in a way to which no other nation is equally subject. If the numbers in the Dominions be equalised as the result of special encouragement of female emigration, there will still remain a large excess of women in Great Britain who cannot be paired in the Empire unless the stream of emigrants who now leave the Empire can be for the most part deflected to the Dominions. In Great Britain the total number of families is limited by the number of males. In dealing with the size of the family needed to maintain or increase population I do not reckon the present surplus of nearly two million women resulting from the joint effect of migration and war. At present our community appears to be in a transitional stage between the limitation of the family by chance and by choice, but the Census shows, from the present age of marriage in Great Britain and the number of deaths before this age, that a general preference for the family of three children would not quite maintain the population, apart from migration. If, therefore, the size of family be universally decided by choice the number of the race cannot even be maintained, far less increased, under present conditions unless those who enter into matrimony cherish the ideal of a family of four children.

Unless the British race increase we cannot insure the internal peace and external security of the Empire, or the continuance of its beneficent work of enlarging commerce and restricting the range of war. Therefore the birth-rate in Great Britain should be maintained above the death-rate at least until the British population in the Dominions exceeds that in the Mother Country. The maintenance of the race will then rest chiefly with our people oversea, and, with their great resources, it should be possible for them to keep pace with the other growing nations.

# MEETING OF THE BRITISH ASSOCIATION FOR ADVANCEMENT OF SCIENCE, LIVERPOOL,

SEPTEMBER 12TH TO 19TH, 1923.

(Report of the Delegate, T. W. Sowerbutts, submitted to a Meeting of the Society on October 9th, 1923.)

THE attendance at this meeting was particularly good, the three thousand members present making it the third in point of numbers of the meetings held during the ninety-one years of the life of the Association.

The Reception Room, General Committee, Conference of Delegates, and two of the Sections were accommodated in the St. George's Hall, one section in the Museum and Art Gallery, one in the Gilmour Hall, and the remainder at the University, and the hospitality extended by the City was on a most generous scale.

The Handbook issued in connection with the meeting is a most interesting work, dealing, as it does, with the various activities and aspects of Liverpool life. Amongst the many papers, too numerous to mention here, there is an excellent note on the Architecture of Liverpool by Professor Reilly, and one on the University by the Vice-Chancellor, Dr. Adami. There was also issued a useful handbook giving details and much information with reference to the Excursions and the various Institutions, Works and other places visited by the members.

The Inaugural Meeting was held in the Philharmonic Hall, when Sir Ernest Rutherford delivered his Presidential Address. The number seeking admission was so great that an overflow meeting was held in the Concert Hall where the address was broadcasted. This wireless demonstration was so efficiently conducted that, as we were informed on the last day of the meeting, every word was distinctly heard even so far away as Switzerland, where of course, according to the clock, it was heard an hour before it was delivered in Liverpool.

On Thursday evening the Mayoral Reception was held in the Walker Art Gallery and the Picton Library; while on

Friday evening, in the Philharmonic Hall, Professor Elliot Smith gave his interesting address on "The Study of Man."

The Local Committee invited some 600 members to occupy the whole of the stalls and dress circle of the Playhouse, on the Monday evening, when two plays were given, "Magic," by G. K. Chesterton, and "The First and the Last," by John Galsworthy.

At the University, on the Tuesday evening, the Scientific Soirée was greatly appreciated, the programme of exhibits and demonstrations running into many pages of a well got-up programme.

The proceedings of Section E (Geography) commenced with the President's Address, in which Dr. Vaughan Cornish discoursed in his usual thoughtful and lucid manner on "The Geographical Position of the British Empire," which, by his kind permission, is reprinted in our Journal. (See page 69.)

Three papers were given dealing with the area which is being studied by the Liverpool and District Regional Survey Association, having Liverpool as its centre and extending nearly to Southport on the north, Wigan and Warrington on the east and including the western portion of Cheshire and the northern slopes of the Flintshire range of hills beyond the estuary of the Dee. "Physiographical Features," by Mr. W. Hewitt, "Distribution of Population," by Mr. H. King, and "Industrial Geography," by Mr. R. C. Moore.

Professor J. L. Myers gave a learned address on "The Marmora Region," which was followed by a Discussion (jointly with Section H) on "The Place of Man and his Environment in the study of the Social Sciences," which was opened by Professor Myers, and continued by Professor H. J. Fleure, Mr. Julian Huxley, Professor P. M. Roxby, Dr. M. I. Newbigin, Mr. H. J. S. Peake and others.

Mr. O. H. T. Rishbeth dealt with "Australian Railway Development," and Miss B. S. Hosgood on "Post-War Emigration from the British Isles," while Professor J. W. Gregory gave an account of his journey "To the Alps of Chinese Tibet." This paper aroused great interest, and members will be glad to note that his son, Mr. C. J. Gregory, who accompanied his father on this expedition, will give to our members a description of their experiences before the end of this session.

"The Influence of Environment on the Character of the Japanese" was dealt with in a most interesting manner by the Rev. Walter Weston, who incidentally gave many details bearing on the recent disaster at Tokio and Yokohama, and showed some excellent photographs including those of a number of buildings which are no longer in existence. I am glad to say that I was successful in arranging for Mr. Weston to come to us early in the new year.

Other papers included—"The High Plateau of Brazil," by Mr. R. R. Walls; "Orfordness," by Mr. J. A. Steers; "Mediterranean Climates of Eurasia and the Americas," by Mr. H. A. Matthews; "Some Geographical Factors in the Development of Irrigated Lands," by Mr. J. N. L. Baker, and "Changes in the Courses of Rivers in the Alluvial Plains of India in their relation to Man and his Activities," by Mr. W. H. H. Arden-Wood.

A joint discussion with Section L on "Geography as a Basis for a General Science Course" was opened by Sir R. A. Gregory, and was continued by Mr. G. G. Chisholm, Mr. W. H. Barker and others.

Our President, Colonel Hy. T. Crook, was invited to preside during one of the sittings of the Section.

At the Edinburgh Meeting, two years ago, a Research Committee was appointed to formulate suggestions for a syllabus for the teaching of geography both to matriculation standard and in advanced courses; to report upon the present position of the geographical training of teachers, and to make recommendations thereon; and to report, as occasion arises, to the Council, through the organising committee of Section E, upon the practical working of Regulations issued by the Board of Education affecting the position of Geography in Training Colleges and Secondary Schools.

This Committee has now issued a report which is of such permanent interest that it might be advisable, if satisfactory arrangements can be made, to have it issued as part of the 1923 volume of our Journal.

The Conference of Delegates met on Thursday and Tuesday afternoons. The President, Professor H. H. Turner, F.R.S., in his introductory remarks, referred to the possible interchange of meetings between Local Societies. Discussions took place on—How Local Societies can assist the Town Planning Movement; Submerged Forests and their investigation, and the feasibility of obtaining Cinema-films on a non-flam base.

It was decided (*inter alia*) to recommend that the publications of Scientific Societies should conform as far as possible to a standard size of page, for convenience in dealing with offprints; and that for octavo publications the size of the British Association's Report be adopted as the standard. To make representations to His Majesty's Government deprecating the unnecessary interference with sites of historic scientific or artistic interest.

To request the Minister of Agriculture and Fisheries to reconsider his decision to discontinue the issue by the Ordnance Survey of quarter sheets of the six-inch map on the ground that, if quarter sheets are not available, teachers, students, and others engaged in research will be put to expense and inconvenience in providing themselves with the sheets necessary for their work.

To call the attention of local societies to the need for prompt and systematic supervision, in the interests of scientific record, of all sections and other excavations which are opened during the construction of new roads or other public works.

While in Liverpool I took the opportunity of accompanying your President on a visit to the Headquarters of the Liverpool Geographical Society, where we were courteously received by the Secretary, Mr. E. H. Cookson, and spent some time in the exchange of views and comparing methods of procedure, we trust to our mutual advantage.

# THE ORIGIN OF THE MANCHESTER PLAIN.

By Professor Owen Thomas Jones, M.A., D.Sc.

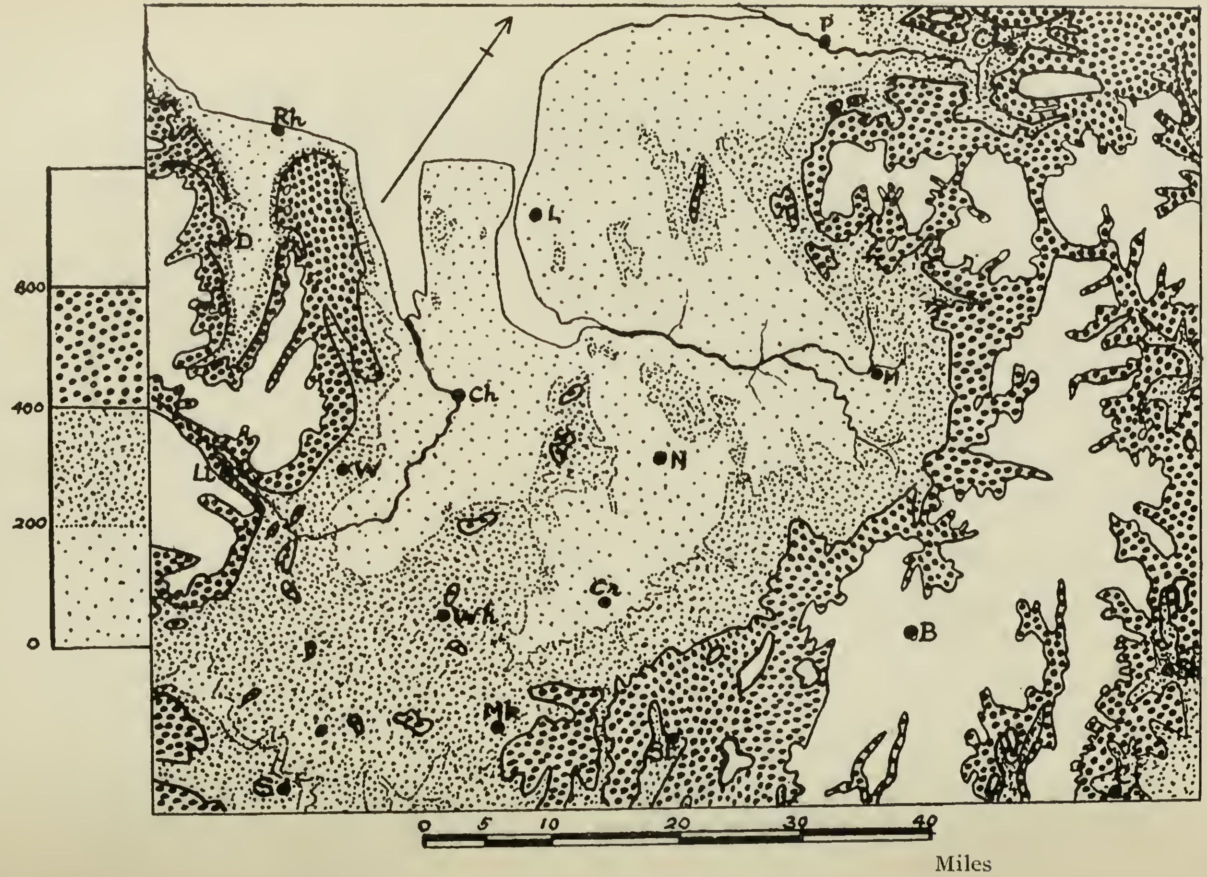
(Delivered to the Society on March 14th, 1924.)

## Introduction.

The Manchester Plain is the name applied for convenience to that part of the Cheshire Plain which lies within a radius of a few miles from the centre of the city. The Cheshire Plain is overlooked on the one side by the Pennines and on the other by the Welsh uplands of Flintshire and Denbighshire. On the north it abuts against the foot of the hills that form the Forest of Rossendale, and on the south against the low hills of South Shropshire. The surface of the plain rises to 300 feet above sea level only in the low range which extends north and south through the Peckforton Hills and Delamere Forest, whereas the hills that surround it rise in places to over 2,000 feet. The plain opens north-west on the Irish Sea, and in the opposite direction it leads by way of the breach in the girdle of hills known as the Midland Gap, into the Midland Plain. It is diversified by many minor elevations and depressions, and along its margin is marked off rather abruptly from the uplands. (Fig 1.)

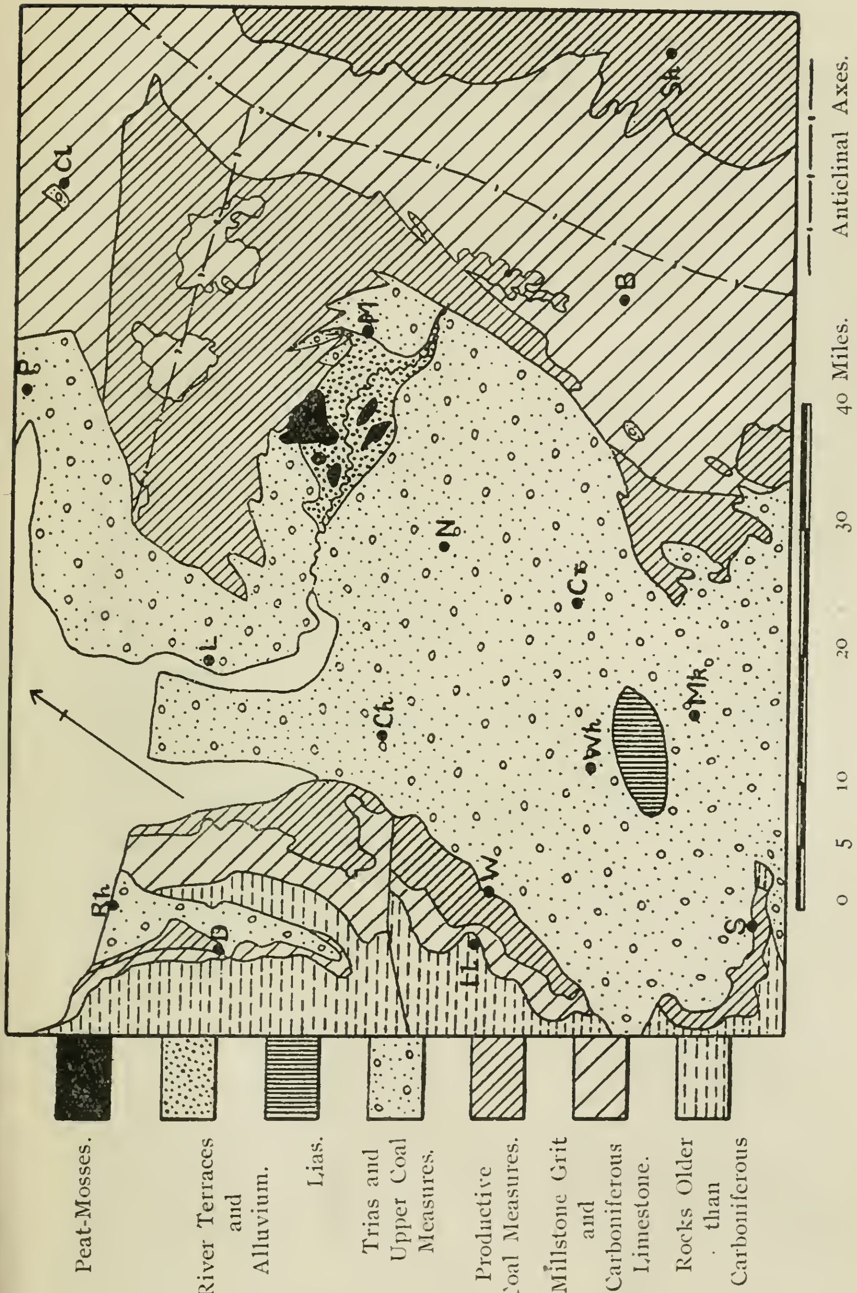
In order to trace the geological history and development of the Manchester Plain it is necessary to refer to the wider area of the Cheshire Plain, with which it has much in common. Again, since the present features of the Manchester Plain are the final result of many processes that have operated upon a region far larger than even the Cheshire Plain, it is necessary to deal in the first place with the region outside the limits of the area, which we shall consider in greater detail below.

An enquiry into the history of the plain must be based upon observations regarding the nature of the strata which underlie it, or that occur in the surrounding country, and the relation of these different strata to one another. Such an enquiry proves that the plain has passed through a far more varied series of changes than its somewhat monotonous surface features would lead us to expect.



B., Buxton.
Cf., Chesterfield.
Ch., Chester.
Cl., Clitheroe.
Cr., Crewe.
D., Denbigh.
L., Liverpool.
Ll., Llangollen.
M., Manchester.
Mk., Market Drayton.
N., Northwich.
P., Preston.
Rh., Rhyl.
S., Shrewsbury.
Sh., Sheffield.
St., Stoke.
W., Wrexham.
Wh., Whitchurch.

Fig. 1. Relief Map of the Cheshire Plain. Scale 1 inch = 15 miles.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40 Miles.
Anticlinal Axes.
Peat-Mosses.
River Terraces and Alluvium.
Lias.
Trias and Upper Coal Measures.
Productive Coal Measures.
Millstone Grit and Carboniferous Limestone.
Rocks Older than Carboniferous

Fig. 2. Geological Map of the Cheshire Plain and the surrounding Country. Scale 1 inch = 15 miles. Place-names as in Fig. 1.

## CARBONIFEROUS ERA.

The Southern Pennine hills are formed of Carboniferous rocks and the three great sub-divisions of that formation—namely, the Carboniferous Limestone, Millstone Grit and Coal Measures—are well represented. These strata are arranged in the form of a low arch or anticline, with the lowest sub-division, the Carboniferous Limestone, in the centre. The elevated moorlands occupied by the Millstone Grit and the lower hills formed of the softer Coal Measures, intervene between the limestone upland and the Cheshire Plain, which is floored by New Red Sandstone, and superficial deposits of clay, sand and gravel. (Fig. 2.) The Carboniferous rocks reappear from underneath the New Red Sandstone on the opposite margin of the plain in North Wales, where the Carboniferous Limestone of Flintshire and Denbighshire forming the uplands, is overlain by representatives of the Millstone Grit and Coal Measures which fringe the plain. Since the Carboniferous rocks of Derbyshire and North Wales are in the main similar, they must at one time have been continued one into the other, and in all probability one or more of these Carboniferous sub-divisions underlie at present the greater part of the Cheshire Plain, and form, as it were, its foundation.

The Carboniferous Limestone was laid down in an ancient sea, and it is known that in North Wales the floor of that sea consisted of still more ancient (Ordovician and Silurian) slaty rocks, upon which the lowest beds of the Limestone can be seen resting. In Derbyshire the base of the formation is nowhere exposed, and there is no direct evidence to show what rocks formed the floor of the Carboniferous Limestone sea. General considerations, based on the relation of the Pennine Chain to the surrounding areas suggest that the core of the chain is formed mainly of much older rocks (Precambrian and possibly Cambrian) than those which underlie the Carboniferous Limestone in North Wales.

While the limestone was being laid down the Manchester area was submerged beneath the Carboniferous sea, in which flourished various marine organisms, whose remains contributed to the formation of the limestone deposits. Since many different kinds of corals are known to have lived in the sea, we may probably assume from analogy with the conditions under which corals thrive at the present day, that a subtropical climate prevailed over this part of the British Isles, and other parts where similar rocks occur. In a southerly direction the limestone sea hardly extended into the region of the South Shropshire hills, but northward it reached at least as far as the present margin of the Scottish Highlands. In that direction, however, great deposits of mud and sand derived from a land area which lay to the north were accumulating at the time when clearer water conditions prevailed in Derbyshire and North Wales.

A remarkable change in the physiography of Britain brought to an end the formation of limestone. The Millstone Grit, which succeeds the limestone, consists in part of coarse and rather angular sands, and in part of dark muds. These two types of materials were laid down alternately, the one to form great beds of grits and the other shales. It is probable that the changes in the physical conditions were brought about by an uplift of the land mass that during the deposition of the Carboniferous limestone lay to the north of the marine area. There is direct evidence of such an uplift in Derbyshire and in North Wales, where the Millstone Grit rests upon the denuded edges of the limestone, but it was probably much more marked nearer the northern margin of the area of deposition.

Professor A. Gilligan[1] concludes that the materials of the Millstone Grit were brought into the North of England by rivers that drained a great land area occupying the north of Britain and extending thence towards Scandinavia (p. 281), and that their mode of accumulation was comparable with that of the deposits in the delta of a great river, or perhaps the combined delta of many rivers. The surface of the delta at times, and possibly throughout the Millstone Grit period, must have been beneath the sea level, since remains of marine organisms (goniatites) occur at frequent intervals in the strata. It is more probable, however, that periods of swampy conditions alternated with periods when a shallow sea covered the area of deposition. The officers of the Geological Survey have recently found evidence that some of the beds of grits become thicker towards the south-west[2], as if some of their materials had been swept into the area of deposition, not only from the north, as Gilligan showed, but also from a land area in the south-west, possibly represented at present by some part of North Wales. If this is the correct interpretation of their observations it is of interest as an indication that even at this early stage in its history the region of the Cheshire Plain was marked out as an intermontane basin on the floor of which were stored the deposits derived from the denudation of the surrounding uplands.

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[1] *Quart. Journ. Geol. Soc.*, vol. lxxv. (1919), pp. 251—294, 1920.

[2] L. H. Tonks and W. B. Wright, "The South-westerly Thickening of the Millstone Grit in Lancashire. Summ. of Progress for 1923." *Mem. Geol. Surv.*, pp. 150—157.

During the formation of the Coal Measures which overlie the Millstone Grit vast areas of Britain were nearly at sea-level, and in the condition of swamps, in which an abundant vegetation grew. There is evidence that occasionally the sea covered considerable portions of the swamp, since in many coalfields " marine bands " are found among the normal sediments. From the partially decayed remains of the vegetation were formed the coal seams of the country. At frequent intervals sand and mud were swept by rivers from some land area (situated probably in the north of Britain and beyond) on to the swamp, burying the vegetable matter that had previously accumulated and preserving it from destruction. The restoration of swamp conditions led to the formation of another coal seam, and in most coalfields this process was repeated many times. Professor P. F. Kendall[1] has gathered a large amount of evidence in favour of this mode of formation of coal seams, although there are still some who maintain that the vegetation which forms the seams of coal was carried by rivers into the area where it is found and laid down in the same way as the sand and mud which separate one seam from another. Professor Kendall relies partly upon the existence beneath coal seams of a small thickness of rock (under-clay), traversed by rootlets and having other peculiar properties. The nature and position of the under-clay or " seat-earth " seem to be best explained on the hypothesis that it is the old soil upon which the vegetation grew. Whether the so-called " growth-in-place " or the alternative " drift " theory be invoked to account for the formation of coal, it is clear that the condition of an enormous area of Britain and other parts of the world must then have been totally unlike that at any other period before or since The Manchester area and the adjoining parts of the North of England formed but a relatively small portion of a featureless plain of vast extent, comparable in some respects with the existing Great Dismal Swamp of Florida. Opinions are not in agreement as to the deduction to be drawn from the character of the vegetation of the Coal Measures in regard to the climate of the period. Some maintain that such luxuriant growths can only have been possible under tropical conditions such as occur, for instance, along the Amazon valley at the present time; there are others who believe that vegetable matter could accumulate to the required amount under subtropical or even temperate conditions.

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[1] P. F. Kendall and H. E. Wroot, " Geology of Yorkshire," 1924..

## New Red Sandstone Era.

The relations of the succeeding formations, the Permian and Trias, to one another and to the Carboniferous formation are not fully understood. Recent work has shown that certain British rocks which had formerly been assigned to the Permian are in reality of Carboniferous age, and further, that it is difficult in some districts to separate the earliest deposits of the Triassic period from certain rocks that were formerly attributed to the Permian; this implies that such rocks formerly regarded as Permian may be of early Triassic age. In view of these uncertainties it is preferable for the present to refer to those red rocks that are clearly younger than the Carboniferous, under the name of New Red Sandstone.

The youngest or uppermost Carboniferous strata, especially of the Midlands, are in the main red rocks, but there are other red rocks which can be shown by their relations to the Carboniferous to be more recent than that formation, and separated from it in time by a period of great movements of the earth's crust. Some of the strata that were formed at the close of the Carboniferous era approach in many of their characters those of the succeeding New Red Sandstone, and are so different from the normal dark-grey shales, sandstones and coal seams of the Coal Measures as to lead to the belief that the physical and climatic conditions that prevailed during the deposition of the New Red Sandstone already existed in the area before the close of the Carboniferous era.

We must now picture the transformation by movements of the earth's crust of the great plain of Carboniferous deposits into an upland basin, bounded by high mountain ranges. The Carboniferous rocks along the line of the Pennine range were arched up into an anticlinal fold, ranging nearly north and south, so that the rocks slope towards the Lancashire coalfield on the one hand and towards the eastern coalfields on the other. North of Manchester there was another anticline, ranging nearly east and west through the Forest of Rossendale. The upland was crossed at intervals by escarpments which were determined by certain fault-lines along which great vertical displacements of the rocks had taken place during the uplift. The Carboniferous rocks of North Wales were also upheaved so as to dip towards the plain, and thus we find that all around the margin of the Cheshire Plain the Carboniferous strata were folded so as to form a great interior basin, surrounded by elevated uplands coinciding with the lines of greater uplift. (Fig. 2.) The actual altitude of the surface of the basin and of the mountain girdle cannot be determined, but the difference between the levels of those areas probably amounted to over three thousand feet. One may probably draw an analogy between the condition of the area at the conclusion of that period of earth movement and that of the Great Basin region lying to the west of the Rocky Mountains of North America. The relief of the Manchester region and the surrounding tracts at that time was probably greater than at any other period in their history, while we have seen that in the immediately preceding period the area was an almost perfect plain.

The rocks in the neighbourhood of Manchester which are referred to the Permian are of limited thickness, and consist of red marls overlying a variable thickness of red sandstone, the relation of which to the uppermost beds of the Coal Measures has not been satisfactorily determined. The New Red Sandstone is represented mainly by the Trias, which consists of two formations, the Bunter and the Keuper. The chief interest of these formations lies in the evidence they afford as to the physical conditions which prevailed in the Manchester area during and immediately preceding their deposition.

The elevation of the district at the close of the Carboniferous era was followed by vigorous denudation. The characters of the New Red Sandstone clearly prove that these deposits were laid down on a land surface under desert conditions, and so effective and rapid was the denudation that the upland region had at an early stage in the New Red Sandstone era been reduced to an almost level plain.

We may picture the area resulting from the post-Carboniferous movements as a comparatively monotonous upland, which was afterwards dissected into deep, rock-bound valleys between which parts of the original surface remained as flat-topped ridges. These were gradually reduced in height and area until ultimately the whole region was degraded to the condition of an almost level plain over which were probably spread certain New Red Sandstone deposits. The present relief of the district must date, therefore, from some period later than the New Red Sandstone era.

The Bunter, which is the lower division of the Trias, is composed of red sandstones, which have been regarded as in part æolian or wind-borne deposits; near the middle it includes, however, a considerable thickness of beds consisting of large pebbles, which were probably carried by rivers. The majority of the pebbles are said to resemble certain rocks that occur in the Scottish Highlands, and may, therefore, have been transported for long distances before they reached the area.

These Pebble Beds have been compared with the gravel that accumulates at the present day on the plain at the foot of the Himalayas, and if as in that area the Cheshire Plain was sinking slowly a great thickness of beds of this nature might accumulate. The fact that the Pebble Beds are thickest to the north-west, and thin away rapidly south-eastward, is a further indication of derivation from the north-west.

The overlying Keuper formation consists in part of sandstones and conglomerates which were deposited in water, and in part of a great thickness of fine muddy rocks known as marls. The marls include near the top the beds of rock salt which have been exploited so extensively around Northwich. The Keuper was apparently accumulated in a great inland lake, which covered a region much larger than the Cheshire Plain, but the area within which the waters of the lake became sufficiently concentrated to deposit rock salt was much more restricted.[1] The Keuper Marls appear to be thicker in the centre of the Cheshire Plain than nearer the margins, and since they were deposited in a shallow lake the centre of the plain must have been sinking steadily during their deposition. It is possible that at the same time the surrounding tracts were rising slowly, and in consequence were undergoing denudation. Such differential movements during Triassic times would result in the Triassic deposits being tilted towards the centre of the plain, but the amount of tilt resulting from this cause would be very small.

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[1] R. L. Sherlock, Special Reports on the Mineral Resources of Great Britain vol. xviii, "Rock-Salt and Brine," *Mem. Geol. Surv.*, 1921.

## Jurassic and Cretaceous Eras.

At the close of the New Red Sandstone era the whole region was a plain nearly at sea-level, and a slight further subsidence carried it beneath the sea in which the clays of the next succeeding Lias formation were laid down. How far they extended is not known; a relic of them is preserved as an outlier south-east of Whitchurch, but they must at one time have occupied a much larger area. It is not impossible, in fact, that the Lias of the Cheshire Plain was continued over the present site of the Pennine Hills, into that of Yorkshire and Nottinghamshire in one direction, and perhaps into that of the Eden valley near Carlisle in the other. If such was the case, the Pennine and Forest of Rossendale areas had passed beneath the sea at the beginning of the Jurassic era.

There is no direct evidence that the Plain was ever covered by later Jurassic deposits, though if the Lias sea extended over the Pennine region there is no reason why other Jurassic formations should not have been laid down over the same region and over the plain to the west. Whatever may have been the condition of the region during the Jurassic era, it is highly probable that during the succeeding Cretaceous era the chalk sea covered the Manchester area, since its deposits occur in the east and south of England as well as the north of Ireland, and the purity of the formation seems to imply deposition at a great distance from land, or in a sea bordering a land area of very low relief. Mr. E. B. Bailey has recently suggested[1] that the absence of sand and mud and the presence of a few well-rounded grains of quartz in the chalk can be accounted for if the land area was under desert conditions during the formation of that deposit.

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[1] The Desert Shores of the Chalk Sea, *Geol. Mag.* (1924), pp. 102—106.

Even if the Pennine and Rossendale areas remained above sea-level during the whole of the Jurassic era, denudation during that immensely long interval must have reduced them to the condition of low-lying plains before the Cretaceous era began. With the enlargement of the ocean basins which occurred at the beginning of the Chalk epoch it seems probable that such plains would have been entirely submerged. We are thus led to the conclusion that the elevation of the hills that now surround the Manchester plain on the east and north occurred some time after the deposition of the Chalk.

## TERTIARY ERA.

We do not know at what precise period renewed movements of the crust caused the plain and the hills to be once more clearly marked out one from the other. Although direct evidence is lacking, there are good reasons for supposing that this occurred early in the Tertiary era (or just before the commencement of that era), when profound modifications in the physical geography took place. Enormous areas of Northern Europe were raised to a great height above sea-level, and concurrently the sea was compelled to withdraw southwards towards Southern Europe, so that in the Tertiary era it was confined to a limited region in the south-east of England and on the Continent. In the north-west of Britain and the north of Ireland these great physical disturbances were accompanied or succeeded by outpourings of volcanic rocks on a gigantic scale, and by intrusions of igneous material within the crust. Professor J. E. Marr[1] has suggested that the Lake District was elevated into a dome during this revolution, and has discussed also the probability that the Pennine region was arched up anew during the same period. Mr. A. J. Jukes-Browne[2] arrived independently at the same conclusion.

Since this episode was accompanied by movement on a large scale of molten igneous material or magma below the crust, it is not improbable that considerable warping or folding of the crust might take place far beyond the area of volcanic action. As pointed out by Professor W. W. Watts[1] and Jukes-Browne (*op cit. supra*), there are many reasons for believing that movements of igneous magma may have occurred during this period around the borders of the Cheshire Plain. At Swinnerton, between Newcastle-under-Lyme and Stafford, a dyke of basalt ranges north-north-west through the Trias. Its characters and trend are similar to the great swarms of dykes which are associated with the Tertiary igneous action in north-west Britain.

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[1] Pres. Address, *Quart. Journ. Geol. Soc.*, vol. lxii (1906), pp. lxxxvi. *et seq*.

[2] Building of the British Isles, p. 78.

It has been suggested, too, that various small sill-like masses intruded into the Coal Measures of the Midlands—*e.g.*, Rowley Rag, near Dudley, the Clee Hills, etc.—may belong to the same period of igneous action. A basalt dyke in the Cleveland Hills which pierces the Jurassic rocks and certain dykes in Anglesey which cut the New Red Sandstone may probably be included with those mentioned above. If these intrusions could all be proved to be of that age one might with some confidence attribute the renewed arching or uplift of the Pennine and Rossendale regions to the same period.

If we assume that the chalk formation and the whole of the Jurassic rocks once covered the Pennines, it is obvious that an enormous amount of denudation must have taken place since that area was uplifted. It is not improbable, however, that even if Jurassic rocks once extended over that region a considerable thickness of them may have been removed as a result of uplift and denudation at the close of the Jurassic era, since we know that in Yorkshire the Chalk rests unconformably on the denuded edges of various Jurassic rocks. Jukes-Browne believed that the Pennine region was covered by about 3,200 feet of Jurassic and Cretaceous deposits,[2] but this is probably an overestimate and takes no account of the probability that uplifts during, and especially at the close of, the Jurassic era may have led to the removal of much of the Jurassic rocks before the beginning of the Cretaceous era. All lines of investigation agree, however, in this, that the Pennine Chain did not exist until after the Chalk epoch, and its origin may, therefore, be assigned with some confidence to movements at the beginning of the Tertiary era. Those movements reproduced in the region surrounding Manchester a relief not unlike that which it had as the result of the post-Carboniferous movements, and it is interesting to note that they also, followed after a period when the condition of the area was that of an almost level plain. Thus the highlands bordering the Cheshire Plain on the north and east reveal themselves as regions of repeated elevation, while the plain itself has at all times been a region of relative depression. The difference in the behaviour of these contrasted regions is probably due to a fundamental difference in the constitution of the crust deep down below the present surface.

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[1] *Proc. Geol. Assoc.*, vol. xix. (1905), p. 180.

[2] *Op. cit. supra*, p. 381.

If this view of the history of the Pennine range is correct, the origin of the drainage system must also date from the beginning of the Tertiary era. We may pass rapidly over the long period of denudation which followed the uplift of the area and removed all traces of such Jurassic or Cretaceous formations as may once have existed there. In the course of this denudation the chalk escarpment has retreated eastwards in Yorkshire and Lincolnshire to within a few miles of the shore of the North Sea. If denudation had been more vigorous all traces of that formation would have been removed from the area north of the Wash, and even from a great part of Norfolk. One might then have supposed that the chalk outcrop was continued from Suffolk north-eastwards across the North Sea, and one would have found difficulty in believing that it had ever extended northwards into Lincolnshire and Yorkshire.

The superior hardness of the Carboniferous rocks in the core of the Pennine and Rossendale uplands as compared with the higher Carboniferous strata and the New Red Sandstone which border and underlie the Plain have served to maintain the difference in relief between those regions, which was initiated by earth movements.

The rivers which flowed away from the crest of the uplifted area surrounding the Manchester Plain, dissected the upland and carved in it a system of valleys which during the Tertiary era attained a mature stage of development. In the interior of the upland there are at present certain valleys, which by their low gradients and gentle slopes, offer a marked contrast to the valleys which trench the flanks of the region. The latter are much narrower and their slopes are steeper. In some cases a persistent shelf which can be observed high above the floors of the existing valleys, strongly suggests that the latter have been carved in the floors of older valleys of far more mature aspect. Where the present valleys enter the region of the plain they are bordered by remnants of a plateau-like tract, suggestive of an ancient base-levelled surface which is not improbably related to the mature valleys that cross the uplands. These features require investigation in detail, but if this be their explanation, the existing topography must be attributed to a renewed elevation of the whole area, including the plain and the upland, thus bringing about a rejuvenation of the drainage system. The mature valleys must be regarded as relics of the most ancient drainage system that exists in the Pennines, and their origin probably dates from the beginning of the Tertiary era. There is no evidence as to the date of the renewed uplift which caused the rejuvenation, but it certainly occurred long before the Glacial epoch, since the valleys were nearly in their present condition before that event. It is possible, therefore, that the uplift occurred during some part of the Miocene or early Pliocene period.

## THE GLACIAL EPOCH.

The events of this epoch exercised a profound influence upon the physical features of the plain, and the fringe of the uplands. The existing surface of the plain is largely due to Glacial deposits, and the courses of the streams that cross it have been to a large extent determined by those deposits. Modifications in the details of the drainage system around the edge of the plain have also been noted, but these modifications become smaller as we ascend towards the uplands. Fortunately, we possess a detailed knowledge of the events of this epoch as they affected the area north of Manchester as the result of the investigations carried out a few years ago by Dr. A. Jowett.[1]

At the maximum of the glaciation the Cheshire Plain was covered with ice, which extended high up the flanks of the Pennines and over the greater part of the Forest of Rossendale. This ice was a lobe from the great ice sheet which occupied the Irish Sea and was fed mainly from the precipitation on the Scottish uplands and the Lake District. On the north side of the Forest of Rossendale there was an area where the Irish Sea or north-western ice impinged upon ice which moved southwards against the flank of the Pennines from the Ribble valley. There were also limited areas occupied by local and possibly almost stagnant ice. In places the edge of the ice stood at a height of at least 1,500 ft. above sea level, but the higher parts of the Pennine Chain appear to have been either free of ice, or, if covered, the ice was probably stagnant. East of Manchester it reached in places to at least 1,250 feet on the slopes of the Pennines.

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[1] *Quart. Journ. Geol. Soc.*, vol. lxx. (1914), pp. 199—231.

The materials left behind after the retreat of the ice consist mainly Boulder Clay, sand and gravel. The first-named is a blue or reddish clay, containing angular and subangular boulders of rocks from more northerly localities, especially from the south of Scotland and the Lake District; occasionally it contains seams of sand and gravel, frequently with abundant coal débris, which was derived probably from the adjoining Coal Measures. The Boulder Clay may be regarded as the ground-moraine of the ice. The sands are of more local occurrence, and their distribution is described hereafter.

When the ice-sheet began to withdraw, the drainage from its surface flowed along the junction between the ice and the unglaciated Pennine area to the east. Wherever the great stream of water crossed a ridge or spur of the hills it cut a valley or notch the size and depth of which was determined by the length of time that the ice stood at such a level as to force the drainage through that particular channel. Further retreat allowed the drainage to escape at a lower level; the higher channel was then abandoned and a new one cut. These cuts across the ridges and on the slopes of the hills are known as overflow channels, and, in general, can only be accounted for as temporary outlets for the drainage when the district was occupied by ice above the level at which they occur. As the ice continued to retreat down the flanks of the hills and the pre-glacial valley floors were exposed, lakes of varying size were dammed in the valleys (by the ice that occupied their lower ends), and discharged from one valley into the next like a series of connected water cisterns; each overflow is recorded by a notch or overflow channel. In East Lancashire Dr. Jowett noted a great number of these channels, ranging in

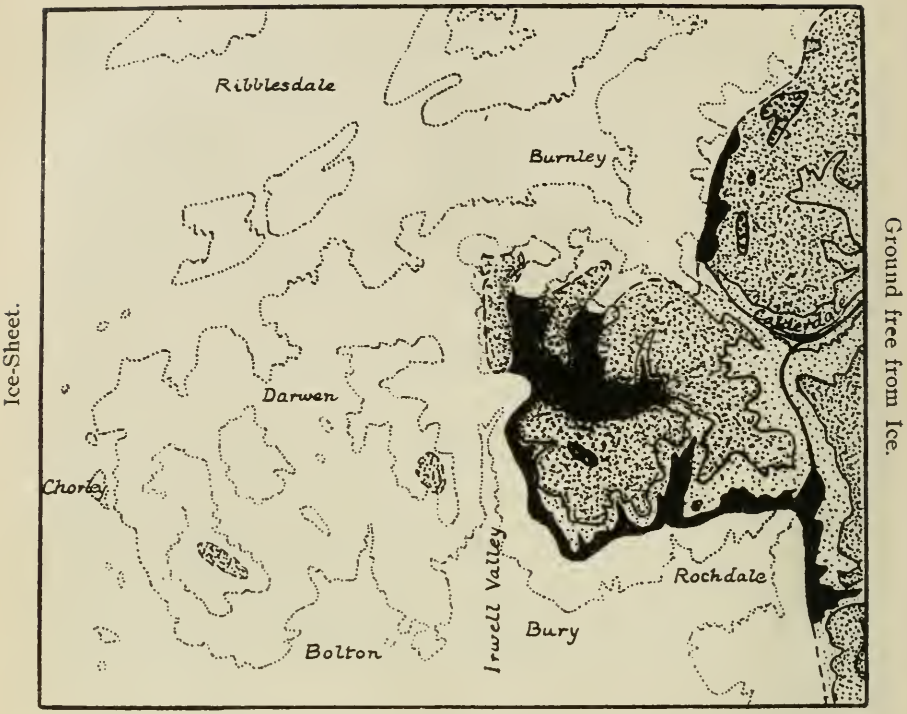

Fig. 3. Early Stage in the Retreat of the Ice from East Lancashire. Small lakes in the valleys of the Rossendale Upland draining into Calderdale.*

altitude from nearly 1,500 feet down to below 500 feet. By their means he was able to trace in detail the progressive retreat of the ice towards the plain and the Irish Sea. For the details reference may be made to the original paper. Two of the stages in the retreat are of special interest in relation to the Manchester area and are reproduced here. (Figs. 3 and 4.) While the ice stood high against the flanks of the Pennines the whole drainage escaped eastwards into Yorkshire, and at one stage it was all carried through two channels into Calderdale—namely, the Cliviger channel, near Portsmouth, and the Walsden channel. (Fig. 3.) The overflow

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* Light stipple, indicates ground between 500 and 1,000 feet; medium stipple, between 1,000 and 1,500 feet; heavy stipple, above 1,500 feet. Black represents lakes dammed by the ice which occupied the area left blank.

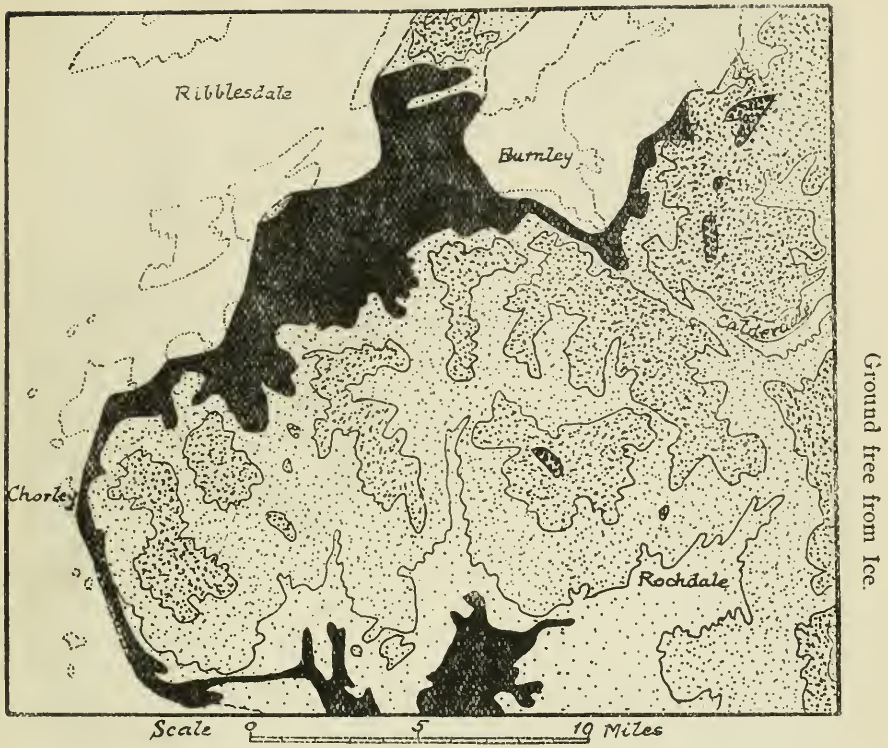

Fig. 4. Late Stage in the Retreat. Large lakes on the flanks of the Rossendale Upland draining southward into the Irwell Basin
* See footnote, p. 104.

valleys are among the most characteristic features of that district.

At a later stage (Fig. 4) another outlet became available farther south and at a lower level than the Cliviger and Walsden gorges leading into Calderdale, and the drainage of very extensive lakes on the north side of the Forest of Rossendale escaped south by way of the Rivington Gap, near Chorley, into the Irwell Basin, and probably from that area into the Mersey Basin. Dr. Jowett's investigations did not extend into the latter area, and the sequence of events along the Pennine slope east of Manchester has not been explored in detail. Numerous overflow channels, however, are known in that region, some of them dating probably from the same time as the higher ones farther north, but after the Calderdale channel was abandoned the whole of the drainage of east and south-east Lancashire must have flowed south along the lower slopes of the Pennines. east of Stockport.

The rock-floor of the Walsden gorge leading into Calderdale is somewhat below 600 feet, and was abandoned when another outlet became available farther south. This was probably the Rudyard gap south of Macclesfield, the rock floor of which is about 500 feet. This in turn appears to have been abandoned while the ice still blocked the drainage seaward across the Cheshire Plain.

Recently Dr. L. J. Wills[1] has shown that the great gorge of the Severn at Ironbridge was cut by the water overflowing from a great ice-dammed lake, occupying the southern part of the Cheshire Plain. It is not unlikely that some time after the Rudyard channel was abandoned the drainage from the whole area between the Forest of Rossendale and the Pennines flowed into this lake, and thus helped to excavate the Ironbridge gorge. It is interesting to note that although the drainage during the Glacial epoch was compelled to flow eastward at various points across the Pennine watershed and its southerly extension, those overflows were all temporary. In the case of the Severn, however, the channel which was cut across the pre-existing watershed has become permanent, probably for the reason that this was the last in the great succession of overflow channels which began at an elevation of nearly 1,500 feet in East Lancashire.

We have next to consider how and when the existing drainage westward across the Cheshire Plain was initiated.

In the neighbourhood of Manchester the Boulder Clay is overlain by a considerable thickness of yellow sands, which are in many places strongly current-bedded—an indication of transportation and deposition by water. These sands form a well-defined ridge extending from Pendlebury and Swinton across the Irwell valley to Prestwich and Cheetham Hill, thence through the eastern suburbs of Manchester. and from there southwards to Heaton Moor and Stockport. Edward Hull, who surveyed the district about 60 years ago for the Geological Survey, believed that east of this ridge the sands are overlain by another layer of Boulder Clay, but E. W. Binney and others held a different view of the relation of these deposits. The origin of the sands is obscure. It is possible that they were deposited as an outwash from the front of the ice which occupied the lower ground on which the main part of Manchester lies. In view of the extensive Glacial lakes which were impounded during a late stage of the Glacial epoch between the ice front or margin and the high ground to the east, the sands may indeed have been deposited in water at the edge of the ice. If, however, that was their mode of origin, it is difficult to understand how another layer of boulder clay could have been deposited over the sands, unless there was a re-advance of the ice front. A further suggestion may be made that what has been termed boulder clay in the area immediately adjoining the sands on the east may be in reality a lake deposit, and it is signifcant that many sections made in that area reveal laminated clay or "book-leaf clay," which was probably deposited in water. There is a striking difference between the highly dissected topography of the sand ridge and the relatively undissected ill-drained tract of clay to the east of it, on which are situated "mosses," such as that near Moston, Little Moss, Ashton Moss, etc. The characters of this tract accord well with the suggestion that the clays were deposited on a lake floor, but it must be admitted that the origin of these clays and their relation to the sands require much further investigation. The re-examination of the district by the Officers of the Geological Survey, which is now proceeding, will probably throw further light on this problem.

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[1] *Quart. Journ. Geol. Soc.*, vol. lxxx. (1924), pp. 274—314.

So long as the ice front was resting in the neighbourhood of the ridge the drainage could only escape southward. The height of the ridge declines gradually from nearly 400 feet around Prestwich to between 240 and 250 feet near Stockport, but the surface of the ice would probably be considerably higher. E. L. L. Dixon[1] has shown that along the south side of the Chesire Plain there are extensive lake terraces at about 300 feet above sea level. A lake at this level would be in communication by way of the Market Drayton gap with the part of the Cheshire Plain between Nantwich and Manchester, and if the ice had at that time withdrawn some distance across the plain one lake would result. Dr. L. J. Wills is of the opinion that the Severn gorge had been cut to below 240 ft.

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[1] "Summary of Progress for 1920," p. 20, *Mem. Geol. Survey*, 1921.

O.D. before the ice drew clear of the Cheshire Plain, since the lowest point between the entrance to the gorge and the Irish Sea is estimated to be about that level. The lowest ground between the Severn drainage and the Mersey-Dee basin is in the Market Drayton gap. It seems impossible to escape the conclusion that as the ice retreated seawards the Cheshire Plain was covered temporarily by a very extensive lake into which flowed the waters from the surface of the ice on the one side, and from the Pennine hills on the other. Its outflow was probably by way of the Severn gorge at Ironbridge, but when the level of the outfall at the gorge fell below about 240 feet the single lake was divided into a number of minor lakes, separated by the drift or other ridges which trend in a general north-westerly direction across the Cheshire Plain, both north and south of the Mersey. These smaller lakes probably drained into one another over the lowest point of the intervening ridges, and thus initiated certain portions of the existing river courses. When the ice drew clear of the coast each of the lakes would be drained and the rivers would commence their careers on the surface of the glacial deposits. Their actual courses were probably determined in part by minor irregularities on the drift surface, and in part by the general seaward slope of that surface. It was thus in the final stages of the ice retreat that the Mersey, the Bollin, the Dane, the Weaver and other rivers resumed their westerly courses to the Irish Sea, which had been interrupted by the glacial conditions.

The later history of the Manchester Plain can best be traced by a study of the Mersey valley below Stockport and of the Irwell valley. Since the rivers started flowing on the glacial deposits which concealed the form of the pre-glacial surface, their present courses do not necessarily coincide with those which they occupied before the advent of glacial conditions, and at Runcorn it has been proved that the old channel of the Mersey is buried under glacial drift and lies to one side of the present channel. It is possible, in fact, that the Mersey in pre-glacial times did not flow out by way of Liverpool.

Miss M. C. March[1] has shown that the form of the pre-glacial surface under Manchester is in many cases quite different from that of the present surface, and that valleys of considerable depth have been filled in by drift so as to produce almost level ground. One such valley runs south-west across Oxford Road, near the site of the Royal Infirmary. The present surface of the plain was thus largely determined by the deposits left behind when the ice retreated. The course of the Irwell was altered greatly at a late stage of the Glacial epoch. Above Radcliffe the river flows in a wide, flat-floored valley of ancient aspect, but for about three miles below that place it runs at the bottom of a narrow, winding ravine of considerable depth cut in Coal Measures (sandstones and shales), until at Nob End it falls into the line of the stream flowing from the direction of Bolton, and thence pursues a south-easterly course towards Manchester. The Radcliffe gorge is so different in appearance from the valley above that it is clearly of much more recent origin, and one must, therefore, assume that the channel previously occupied by the Irwell below Radcliffe is now buried beneath glacial drift. It may be suggested that it lies somewhere near Whitefield and Prestwich, where the thickness of the drift is known to be very great.

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[1] " The Superficial Geology of Manchester." *Mem. Manch. Lit. and Phil. Soc.*, vol. lxii (1918), No. 11, pp. 1-17.

## The River Terraces.

In order to understand the history of the Manchester area between the time when the westerly drainage of the plain was restored and the present day, it is an advantage to begin with the existing conditions. The Mersey pursues a meandering course across a level alluvial plain, of varying width. Formerly the river during floods spread over this plain, and by depositing sand and mud slowly raised its level. The areas that would thus be liable to flooding are known variously as water meadows or Eas (Ees). In order to prevent floods, embankments were constructed on each side of the river from the point, about 1½ miles below Stockport, where the river emerges from the gorge in the New Red Sandstone. If it were not for these embankments and other precautionary measures the loops or meanders would not remain stationary, but would tend to travel slowly down the valley, each meander chasing the one in front. It would be interesting if historians could tell us at what date these embankments were made. The late Professor G. Unwin informed me that he thought they had been constructed between 130 and 150 years ago. It

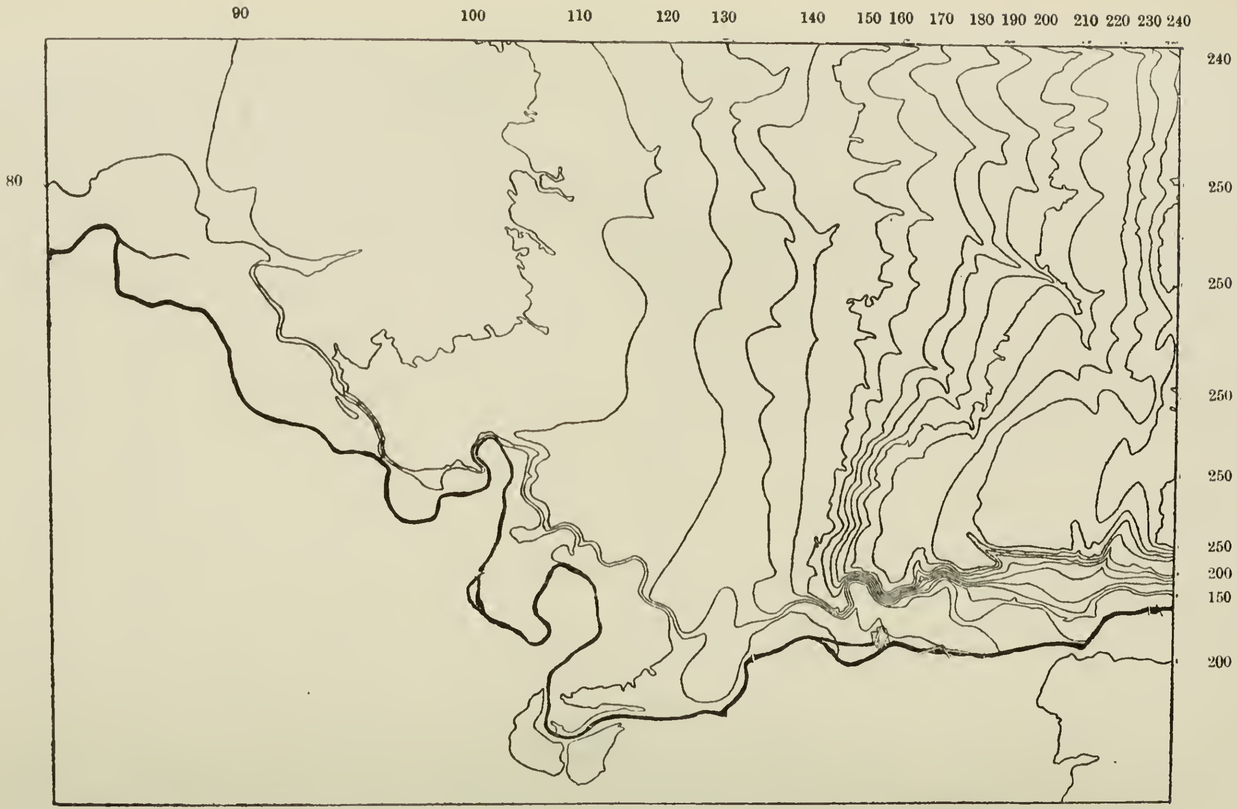

Fig. 5. Contoured maps of the district south-east of Manchester and north of the Mersey. Scale 1 inch = 1 mile; contour interval, 10 feet.

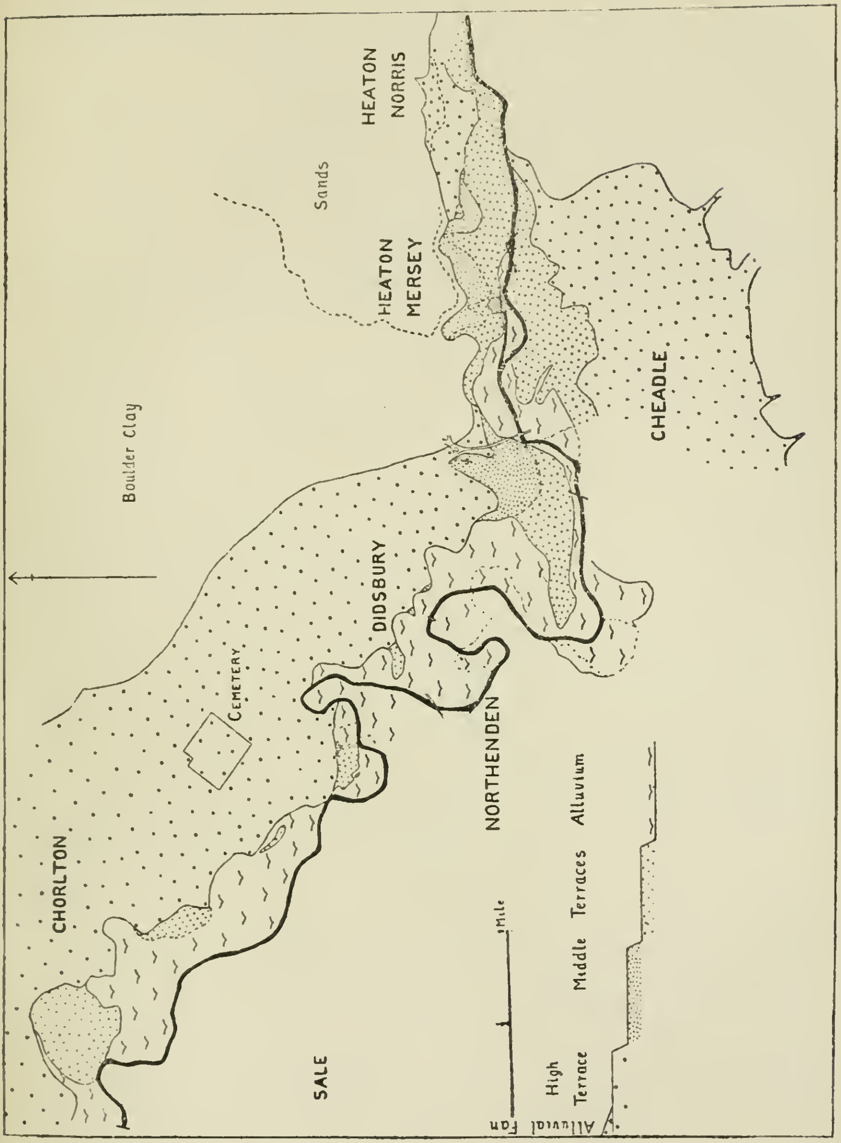

Fig. 6. Map of the Superficial Deposits south-east of Manchester. Scale, 1 inch = 1 mile.

may be noted that one effect of thus confining the river to a narrow channel and preventing it from spreading over the water meadows would be to increase the amount of sand and mud carried down to the mouth of the river, since much of these materials was previously deposited on the alluvial plain.

We can detect in many places evidence of changes in the position of the river channel in past times; the abandoned courses are indicated by wide depressions having the form of the present meanders, and in some cases are still partly undrained. It is interesting, also, to note that whereas the boundary between Lancashire and Cheshire usually follows the centre of the river there are instances where it deviates from that position in such a way that parts of Cheshire lie north of the river and parts of Lancashire lie south of it.

Just above Northenden the boundary pursues a sinuous course, in two places south and in two other places north of the river, and just below that place, near Red Bank, it forms another small loop north of the river. (Fig. 6.) In all these cases it undoubtedly coincides with an old course, and it would be interesting to know whether the river was flowing that way when the county boundary was fixed. If so, considerable changes in the position of the channel had occurred before the embankment was made. But if these changes had occurred at some places one would have expected that the position of the channel would have shifted in other places also. It may be that the boundary was fixed at certain points by reference to well-defined objects or physical features, or it may have been represented on some kind of map, and that elsewhere it was defined as being at the centre of the channel of the Mersey, and would thus shift with every change in the channel. This topic, also, may be commended to the notice of historians.

The Alluvial Plain commences near the Heaton Mersey Bleachworks, or a little below the point where the river emerges from the rock gorge below Stockport. Its level there is about 125 feet, and near Stretford bridge, six miles below, it is about 65 feet, so that the plain slopes at an average rate of 10 feet per mile. Anyone walking along the river bank between Heaton Mersey and Jackson's Boat, near Chorlton, cannot fail to observe level-topped platforms standing several feet above the Alluvial Plain, and separated from it by a steep bank or step. These platforms are found to be composed of materials such as loam, sand and gravel, similar to those that form the Alluvial Plain, and are clearly river deposits. Such platforms are known as River Terraces, and are, in fact, relics of ancient alluvial plains. Their materials were laid down at a time when

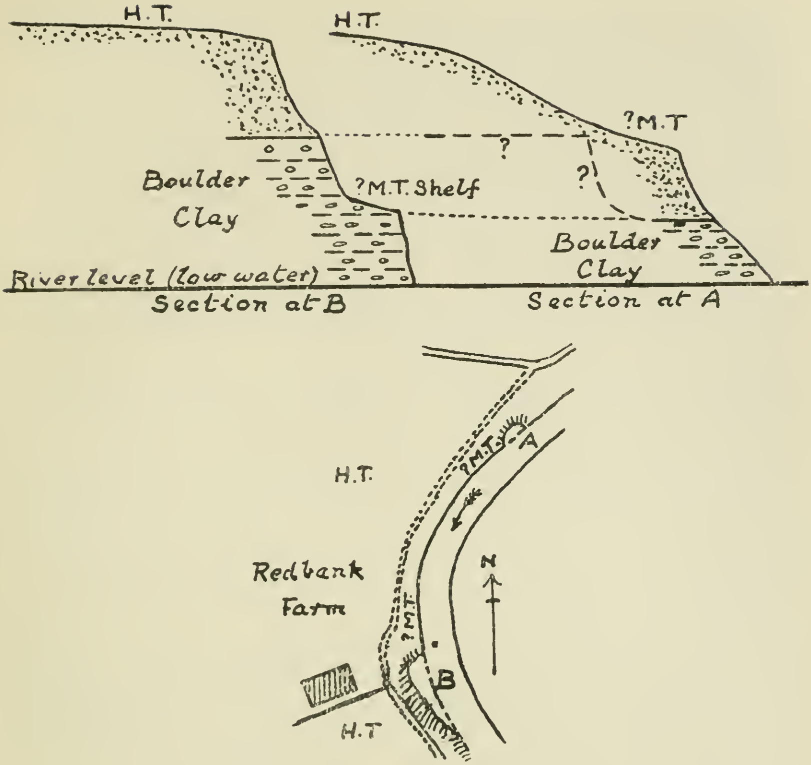

Fig. 7. Sections in the bank of the Mersey near Redbank Farm at places marked A and B in Sketch Plan. Scale 1 inch = 100 yards.) Vertical Scale of Sections 1 inch = 20 feet.

the Mersey flowed at a higher level than it does at present. In places the platforms stand 6 to 8 feet above the Alluvial Plain, and in others they may be as much as 25 to 30 feet above its level. Careful examination reveals the existence of remnants of three distinct terraces. By far the most extensive of these ancient alluvial plains is that which occurs on each side of the river below Stockport, and most of the southern suburbs of Manchester lie on it (*e.g.*, Didsbury, Chorlton, Stretford, Urmston and Flixton). It extends, also, south of the river under Cheadle, Northenden, Sale and Ashton-on-Mersey. It stands about 25 feet above the Alluvial Plain, and somewhat higher towards Stockport, and may be distinguished as the Didsbury or High Terrace. Between it and the Alluvial Plain there are traces of two lower terraces, one about 15 feet above the plain and the other 8 to 10 feet. The best preserved remnant of the former is at Underbank Farm, half a mile above Heaton Mersey Bleachworks, and the latter projects as a long tongue into the Alluvial Plain around Millgate Farm, south of St. James's Church, Didsbury. The distinction between these two terraces is not, however, easy to make in certain places, and it is sometimes convenient to refer to them collectively as the Middle Terraces. The surface of the Middle Terraces is often undulating, and in this respect is in marked contrast to the Didsbury Terrace and of the Alluvial Plain, both of which are remarkably even. Whether this is due to some peculiarity in the conditions which prevailed during its formation, or whether the higher parts of it represent relics of a higher terrace, it has not been possible hitherto to determine. The information furnished by these terraces enables us to reconstruct step by step the history of the Mersey, since it resumed its westerly course.

In the first place, the surface of the High Terrace is below the level of the drift on each side. At Red Bank, west of the Northenden Road, a thickness of 10 to 12 feet of gravel belonging to this terrace can be seen overlying the Boulder Clay in the river bank. (Fig. 7.) Since the river, after the retreat of the ice, flowed on the surface of the drift, it must have begun its post-Glacial career by excavating a valley in the drift to a depth depending on the original level of the surface of the glacial deposits. South of Didsbury, where the top of the High Terrace is approximately at the same level as the adjoining boulder clay, the depth of the valley so excavated probably did not exceed 15 to 20 feet; but near Stockport, where the drift rises to over 240 feet above Ordnance Datum, and the level of the terrace is about 160 feet O.D., the valley must have been at least 70 to 80 feet deep. During this phase of excavation the drift deposits were swept out from a large area of the valley floor.

In the next place we have to inquire into the conditions under which the gravel and sand of the High Terrace were laid down. West of Manchester the combined High Terrace gravels of the Mersey and Irwell extend from Eccles on the north to near Altrincham on the south, a distance of seven miles across the trend of the Mersey valley. The Alluvial Plain of the Mersey is nowhere more than a mile wide. In view of this difference it is tempting to suppose that the river which deposited the older gravels not only flowed at a higher level than the existing Mersey, but was also a river of enormous volume. It does not follow, however, that the river covered a plain of this width all at the same time, and the probable volume of the river can only be arrived at from other considerations.

There is an intimate relation between the volume or size of a river, its gradient or fall in feet per mile, and the amount (as well as kind) of material it is given to carry; the latter is known as its load. A river of large volume has a smaller gradient than a small river, and a river supplied with a large load must have a higher gradient than one of the same volume with a smaller load. If any one of these conditions is changed during the life history of a river the longitudinal profile of the river valley is altered in consequence.

A wide plain of gravel and sand, such as the Didsbury Terrace, was not covered by the river all at one time; its width is due to the fact that the river channel was constantly shifting from one position to another on the plain. These changes were brought about by repeated deposition of material on the bed of the river, with the result that each channel that the river occupied was gradually filled with gravel and sand, and the river was forced elsewhere. The river, driven out of one channel, made its way along the lowest accessible part of the plain, which was in turn raised up in consequence of deposition, and so in succession the whole plain was gradually built up and simultaneously increased in width as the river deposits spread over such low-lying areas as adjoined the valley floor.

This mode of formation of extensive gravel plains can be observed in Iceland at the present day. The rivers flowing from certain of the glaciers are not confined to a single deep channel, but break into a multitude of shallow courses, which separate and unite in a complicated fashion, and are continually changing in position and depth. Such rivers have been aptly described as "braided" rivers, the numerous interlacing channels being compared with the strands in a strip of braid. It may be assumed that the Didsbury Terrace was formed by a river which was amply supplied with sand

and gravel, or, in other words, was heavily loaded, and thus became a braided river. This led to rapid deposition or building up of river deposits, and the river during that process probably wandered over its plain in much the same manner as do the existing Icelandic braided rivers.

A heavily loaded river of the same volume as the present Mersey would require a much higher gradient or fall than the existing river. The difference between the slope of the Didsbury Terrace and that of the Alluvial Plain is, however, very small, amounting to about 1 ft. per mile, and rather more near Stockport. (Fig. 8.) We are driven to the conclusion that the volume of the ancient river was considerably greater than that of the Mersey, and as we have no reason to believe that the drainage area was greater than it is to-day, the greater volume can only be accounted for by a greater rainfall at that time. This conclusion appears to support the view that has been put forward that the Glacial epoch was followed by a Pluvial or Rainy epoch.

We find, therefore, that immediately after the retreat of the ice from the Cheshire Plain the Mersey valley was excavated to a variable depth through the glacial deposits. This stage was followed by a building up or aggradation of the floor of the valley by river deposition. Since the aggradation was due to the heavy load that the river had to carry, we have to consider why it was possible for the river in the preceding stage to excavate and carry away the glacial deposits from the valley. It may be suggested that, although the ice had retreated from the immediate area of the Cheshire Plain, the climate remained severe for a considerable period; the soil would thus be frozen to some depth and protected from denudation. The rivers, while having a large volume, due probably to heavy rainfall at certain periods of the year, would in consequence of the climatic conditions have a light load, and so would be able to excavate their channels vigorously. When the climate ameliorated a large area of soft glacial deposits would be exposed to active denudation and the load of the rivers would increase to such an extent that further excavation not only became impossible, but deposition of the materials on the valley floor occurred.

The sequence of events, which is recorded in the valleys of this district, can also be observed in most of the valleys of Wales, and appears to be a general feature of early post-Glacial times.

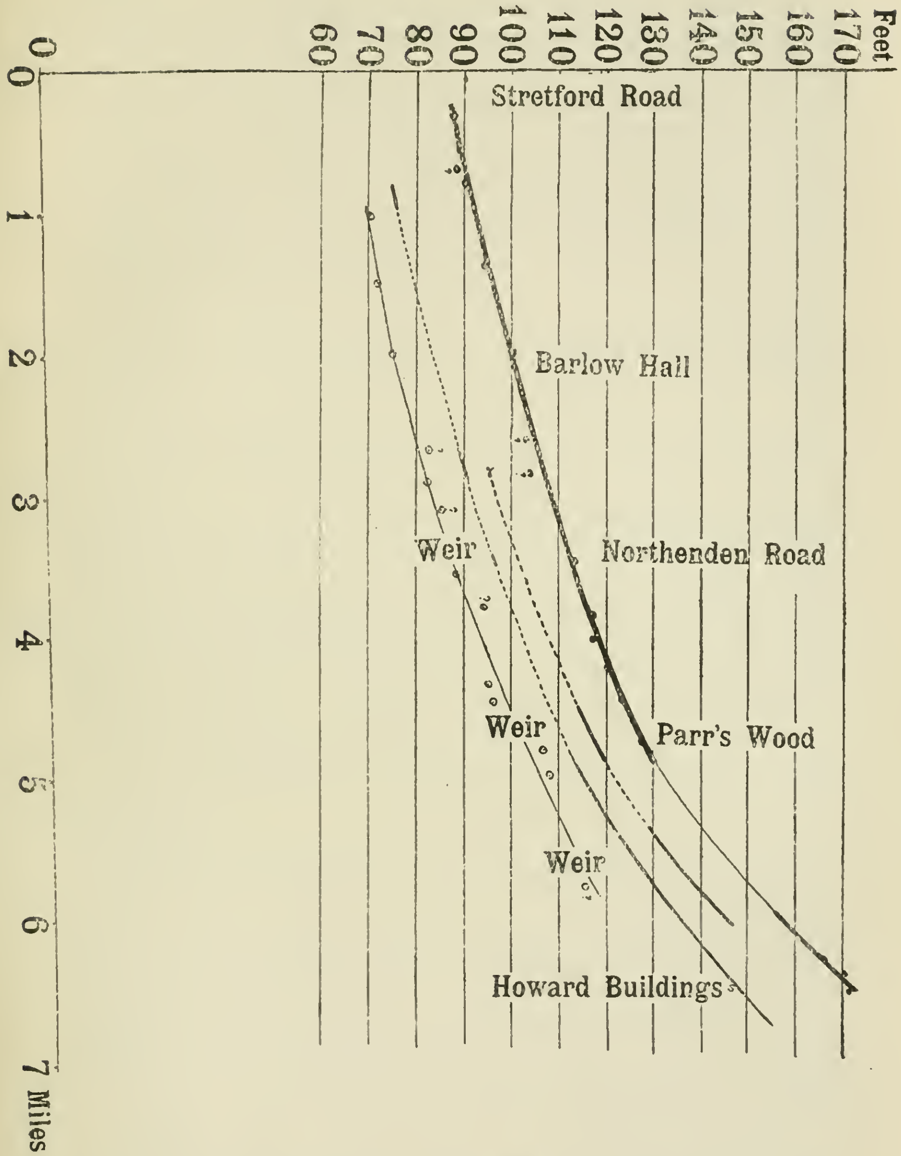

Fig. 8. Longitudinal profiles of the Mersey River Terraces and Alluvial Plain between Stockport and Stretford Road. Vertical scale exaggerated 176 times.

### FORMATION OF THE MOSSES.

Towards the closing stage of the formation of the Didsbury Terrace, the Mersey and Irwell valleys must have presented the appearance of a vast plain sloping gently seawards, and near its western end large areas of the plain must have been waterlogged. The trend of the contour lines across the terrace indicates that the surface of the river plain was somewhat higher near the centre than towards its margins, so that it was slightly arched from north to south. (Fig. 5.) This is, indeed, what would be expected, since on a plain formed by aggradation deposition is most active towards the centre of the tract covered by the river. From each margin the surface occupied by the glacial deposits rose above the level of the plain. Near the margin of the valley floor there was, therefore, a shallow trough bounded by the opposed slopes of the river deposits and the glacial drift; this would be the first area to become waterlogged. It was apparently at this stage, and under some such conditions, that the great mosses which occur below Manchester began to grow. Those north of the Mersey include Chat Moss, Glazebrook Moss and Risley Moss, while south of the river are Carrington Moss and Warburton Moss. Farther east the moss after which Moss Side and Moss Lane are named stood near the boundary between the terrace deposits and the underlying boulder clay. This is also the situation of the largest of all—Chat Moss—which lies partly on the terrace and partly on boulder clay. It is probable that the mosses north of the river were at one time united, and this may also have been the case with those south of the river. The waterlogged condition of the Mersey valley at the close of the High Terrace stage, which made possible the beginning of the growth of the great peat mosses, seems also to be reflected in the Irwell valley. Mr. Joseph Burton, of the Pilkington Tile and Pottery Works, brought to my notice some interesting sections near the works in what appears to be the High Terrace of the Irwell, which corresponds to the Didsbury Terrace of the Mersey.

The river gravels are there succeeded by a few inches of sandy clay, which passes rapidly upwards into a fine yellowish clay. Mr. Burton expressed the opinion that this clay would settle very slowly in water and could only have been formed in a lake. With this suggestion I am in agreement, and its formation may probably be attributed to that stage in the history of the valleys when the Mersey valley was a vast marsh, which afterwards developed into the great peat mosses.

After the deposition of the Didsbury Terrace and the growth of the mosses, there was renewed excavation and the terrace deposits were removed from the centre of the valleys. During this process the Middle Terraces were formed, and by corresponding excavation by certain streams draining into the main valley the mosses were apparently cut up into separate areas as we find them to-day.

It may be too readily assumed that the renewed excavation of the valleys must have been due to an uplift of the area subsequently to the deposition of the High Terrace, but it must be borne in mind that other causes could have led to this result; some of these are briefly discussed.

1. When the ice retreated from the bed of the Irish Sea, the floor of that sea was encumbered by a great depth of glacial deposits, over which the rivers made their way. Marine erosion, by attacking those deposits, developed cliffs on each side of the river mouths, and as the cliffs receded inland under the attack of the waves, the courses of the rivers were steadily shortened, and their gradients were in consequence increased. The effect of increased gradient would then be propagated gradually upstream, and would result in erosion of the river channels.

It is impossible to estimate how much excavation might have resulted from this course alone, but its amount was not negligible.

2. During the formation of the High Terrace it must be assumed that abundant material was available for transportation by the rivers, since the profiles of the valley floors and valley slopes had not attained stability, and were, therefore, undergoing rapid change of form.

At a later stage, when those features had attained a more stable condition, the load of the rivers was of necessity diminished. If the volume of the rivers remained unchanged up to that stage the diminished load could be carried down a smaller gradient, and in order to attain this condition the valleys would be excavated, especially in their middle reaches.

3. Again, the rainfall might have been greater than it was during the High Terrace stage, and unless the load was correspondingly increased the rivers could, with their greater

volume, carry their load with a lower gradient, and the valleys would have to be refashioned.

It will thus be seen that, besides an elevation of the land area, excavation of the valleys may have been due to one or more of several causes. Two of these—namely, diminution of load and shortening of the river courses—were almost certainly in operation.

On the other hand, if the formation of the High Terrace gives evidence of a Rainy epoch, we must suppose that the rainfall, and with it the volumes of the rivers, subsequently diminished. Assuming the load to remain unchanged, this would result in aggradation; but if, *pari passu,* the load became less, such a balance might be established between that factor and the volume as to enable the rivers to maintain the same gradient as during the High Terrace stage. In that case, apart from the influence of marine erosion in increasing the gradient of the rivers, an uplift of the land area would appear to be necessary in order to bring about renewed erosion.

So far as the limited data allow an inference to be drawn, it appears that the gradient during the formation of the Middle Terraces of the Mersey was nearly the same as that of the Alluvial Plain. (Fig. 8.)

It has also been assumed that when a river valley is bordered by a series of terraces a succession of uplifts and pauses must be postulated—an uplift for each terrace step and a pause during the formation of the gravels which overlie the step. Professor W. M. Davies[1] has shown that the formation of terraces at various levels is a necessary consequence of excavation by a river, even though the excavation may have been initiated by a single uplift.

It is, unfortunately, not possible with the evidence that has been obtained in the neighbourhood of Manchester to decide which among the various alternative causes sketched above may have been responsible for the formation of the Middle Terraces. The possibility that uplift may have occurred is, however, strongly suggested, when we consider the probable depth to which the valley had been eroded when the process of excavation ceased. In this connection it is necessary to review the evidence of relative movements of the land and sea which are preserved around the coasts of the Irish Sea, and to consider the consequences of such movements on the rivers entering that area.

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[1] "Geographical Essays."

The latest of those movements was one of depression of the land area, and resulted in the submergence or drowning of various marshy and peaty tracts which formerly existed above high-water mark, so that their remains are now found between the limits of high tide and low tide. Among the so-called Submerged Forests or "Noah's Woods" may be mentioned that near Leasowe, but similar forests occur along the Welsh coast and on both sides of the Bristol Channel. I have elsewhere given reasons for supposing that this submergence took place towards the close of the Neolithic or Newer Stone Age.[1]

Clement Reid ("Submerged Forests") has collected evidence from various deep excavations around the British coast, proving the existence in many places of other Submerged Forests lying far below the Upper Forests, and indicating a submergence of at least 65 ft., and possibly as much as 90 ft., since the forest grew. Before their submergence the land must have stood considerably higher than it does at present.

On the other hand, various investigators[2] have described at certain points around the coasts of the south of Ireland and South Wales, relics of a Raised Beach which is in places overlain by glacial deposits. The wave erosion which cut this rocky shelf around our coasts, must, therefore, have occurred before, at any rate, the close of the Glacial epoch, when the land stood about 25 feet lower than at the present day. Here, then, we have evidence, within the same region, of uplift of the land area on the one hand and of depression on the other, and of necessity these movements occurred at different times. Since the latest movements, such as that responsible for the submergence of the Leasowe Forest, may be ascribed to a recent date, and appears, in the south of Britain at any rate, to have been the end term of a period of depression which carried the lower submerged forest to far greater depths, it is probable on these grounds alone that the uplift preceded the depression. If we assume a depression of 75 feet, then, since the Raised Beach is still about 25 feet above mean sea-level, the uplift preceding the depression must have been about 100 feet.

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[1] "The origin of Welsh Legends," *Welsh Outlook*, Jan., 1921.

[2] R. H. Tiddeman, "On the Age of the Raised Beach of Southern Britain as seen in Gower," *Rep. Brit. Assoc.*, Bradford (1910); H. B. Maufe and W. B. Wright, "The Pre-glacial Raised Beach of the South Coast of Ireland," *Proc. Dub. Soc.*, vol. xli (1904), p. 250.

It has been shown by Mr. W. B. Wright[1] that the Raised Beach is covered by angular material called Head, which was a product of subærial weathering of the cliff. The Head is in turn covered by glacial deposits, so that some of the uplift must have occurred before the close of the Glacial epoch. It is possible, however, that the greater part of the uplift took place later. Since this uplift affected a wide area it must have produced a marked effect upon the erosion of the valleys bordering on the Irish Sea.

We may, therefore, provisionally correlate the excavation of the Mersey valley and the formation of the Middle Terraces with this uplift. Since that period a submergence of 75 feet, more or less, has brought about the last of the series of changes which the Manchester Plain has witnessed. The depression of the land area and of the valleys crossing it necessitated a silting up, or aggradation of the valley floors, so as to bring the rivers into relation with the new level of the sea. It may be suggested that the latest deposits of the Mersey valley extend to a considerable depth below the present alluvial plain, and that they conceal the floor and slopes (perhaps also other terraces) of the valley that was excavated through the river gravels of the High Terrace and the glacial deposits or solid rocks upon which they were deposited. Before the depression began the edge of the Didsbury Terrace may have overlooked the floor of the old Mersey valley at a height of nearly 100 feet, forming a bold and striking feature in the scenery of those days.

A general consideration of the modes of origin of the Manchester Plain has shown us that a great variety of processes have operated in its formation, and each one has left some effect upon the scenery or relief of the area. Deposition of sediment in a clear sea, thriving with marine life, great swamps supporting an abundant vegetation, mountain ranges and escarpments and their destruction by denudation under desert conditions, the occupation of the area by great ice sheets, moving relentlessly across the plain and against the flanks of the hills, damming up great lakes, and leaving behind them clay, sand and boulders that were transported into the area from northern districts, river action depositing a great plain of gravels and later re-excavating their valleys through the river deposits, and finally the subsidence of the region almost within historic times, followed by the silting up of the valleys, which gave the finishing touches to the form of the surface of the plain.

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[1] *Op. cit.*, and "The Quaternary Ice Age," p. 99.

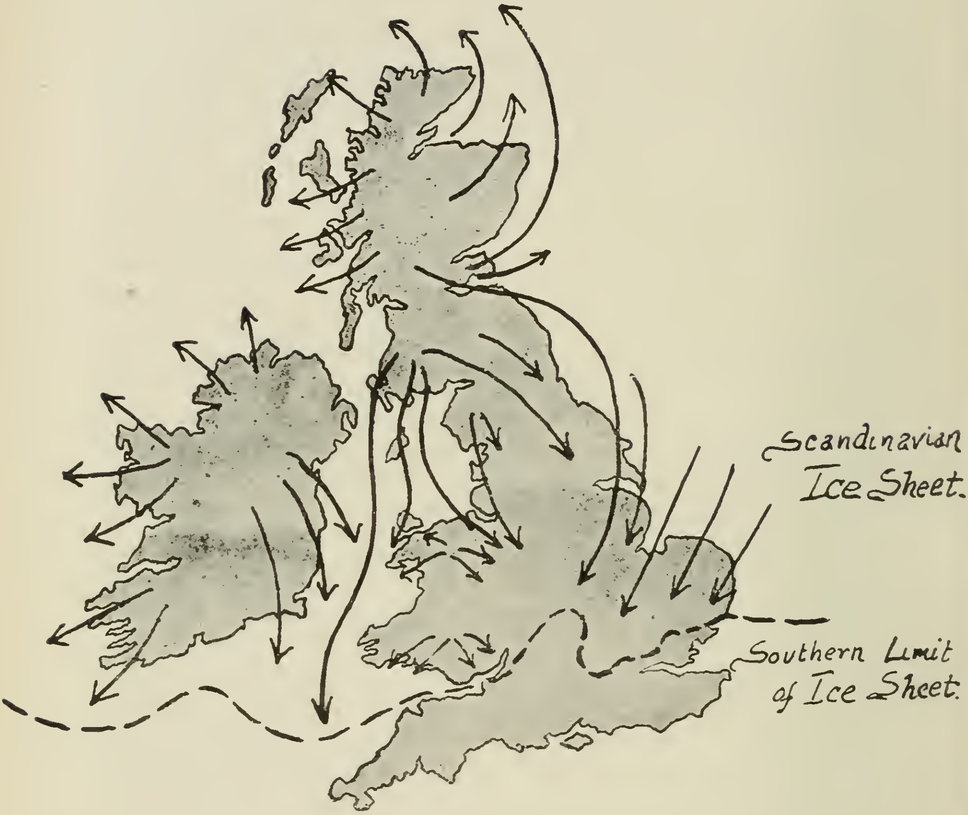


Diagram I.

The Glaciation of the British Isles showing Invasion of Lancashire and Cheshire Plain by Ice from :—
(*a*) The Southern Uplands.
(*b*) The Irish Sea.
(*c*) The Lake District.
(*d*) The Cambrian Uplands.

# CHESHIRE VILLAGES.

## Some Causes Determining their Location.

(Delivered to the Study Circle on Dec. 2nd, 1924.)

By H. W. Ogden, B.Sc.

A map of the Cheshire Plain, with its villages and towns dotted promiscuously over its surface, seems to present an accidental and haphazard network of human communities. It is the purpose of the present enquiry to discover, if possible, some cause or causes determining this distribution. In an investigation of this kind there is one important principle that will act as a guide. Early communities settled themselves where there was potable water and cultivated land; therefore, to establish the water line in the region where opportunities exist to raise food, is to determine lines of settlement.

But on the Cheshire Plain the water line—if there is one at all—would seem to be of too zigzag a character to merit the name; quite different is it from the water line of the Scarplands of the south at the junction of the chalk and clay. Geological causes have determined it in both cases, but those acting in the former case have been far more complex than those operating in the latter, and it is the complexity of cause that has resulted in the complexity of location.

The most powerful force would seem to be the glaciation of the area by the Quaternary Ice Sheet. Diagram 1 will show that the ice sheet covering the area had at least four sources of supply :—

(*a*) The Southern Uplands.
(*b*) The Irish Sea.
(*c*) The Lake District.
(*d*) The Cambrian Uplands.

At the time of maximum glaciation this great sheet covered the land to a depth estimated at 1,200 feet in the neighbourhood of Macclesfield; further north and to the middle of the plain the thickness increased; thinning occurred with the southern movement of the ice until the limit was reached in the neighbourhood of the Thames.

Ice sheets of this kind carry nothing on their backs; the material transported is entirely englacial or subglacial; the final extrusion of the former originates a boulder moraine characterised by the presence of an abundance of ice-moulded stones; the latter causes the formation of a Boulder Clay or Till, the material of which is derived from the abrasion of the rocks over which the ice is passing, and which may consequently vary in composition while being constant in its compactness and general impermeability to water. This is the most extensive deposit on both the Lancashire and Cheshire Plain, and is spread out in undulations and with little variety of surface feature up to the 600 ft. contour. It

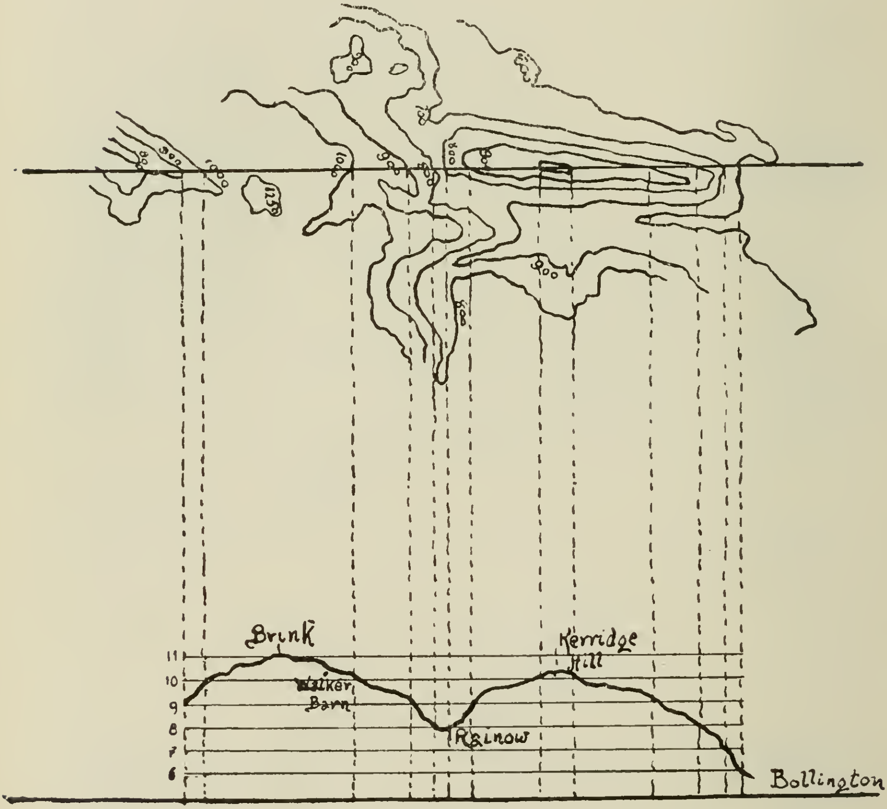


Diagram 3.

A Glacial Overflow Channel at Rainow near Macclesfield—south end of Kerridge Hill.

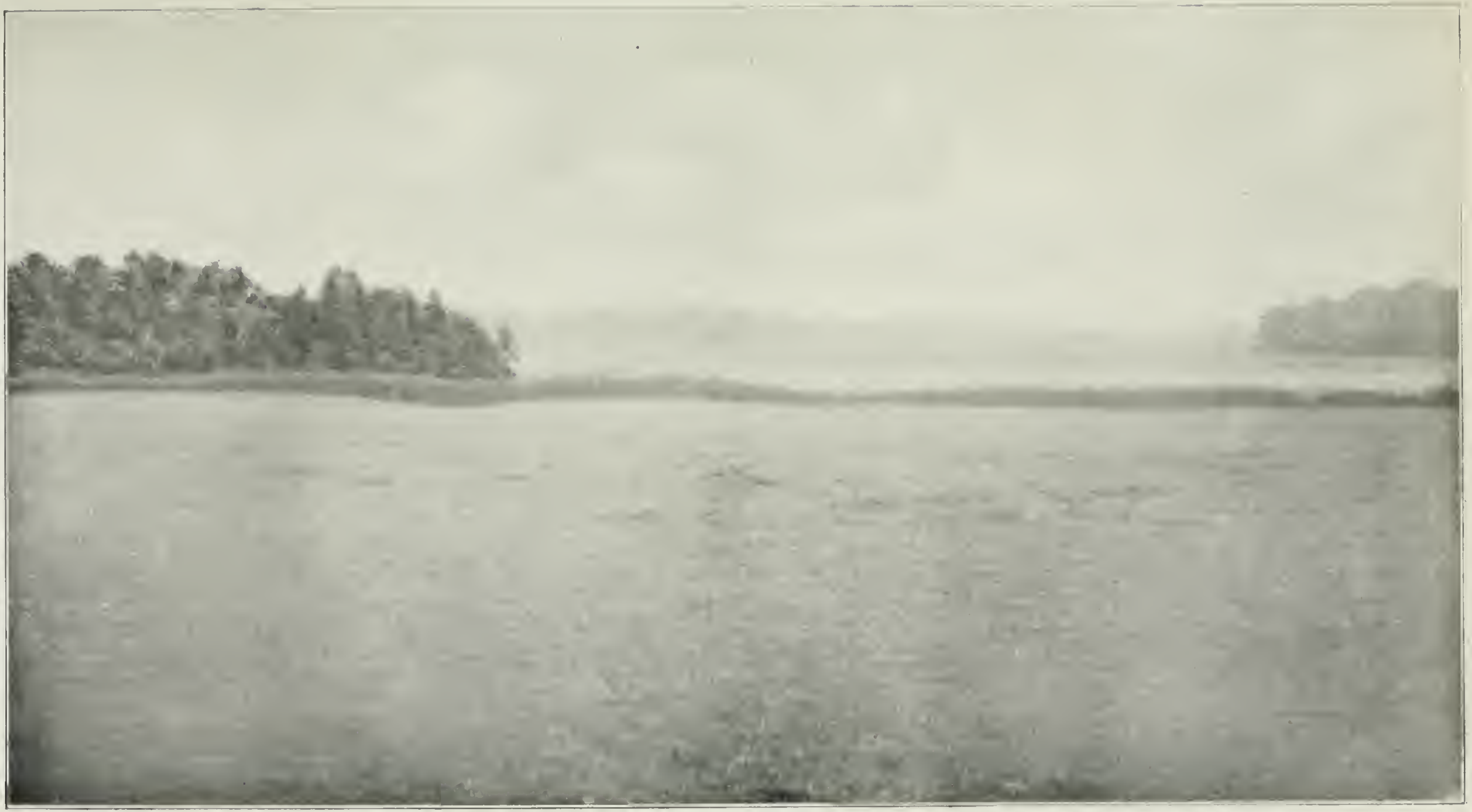


Diagram 2. The Undulations in the Glacial Clay of the Cheshire Plain.

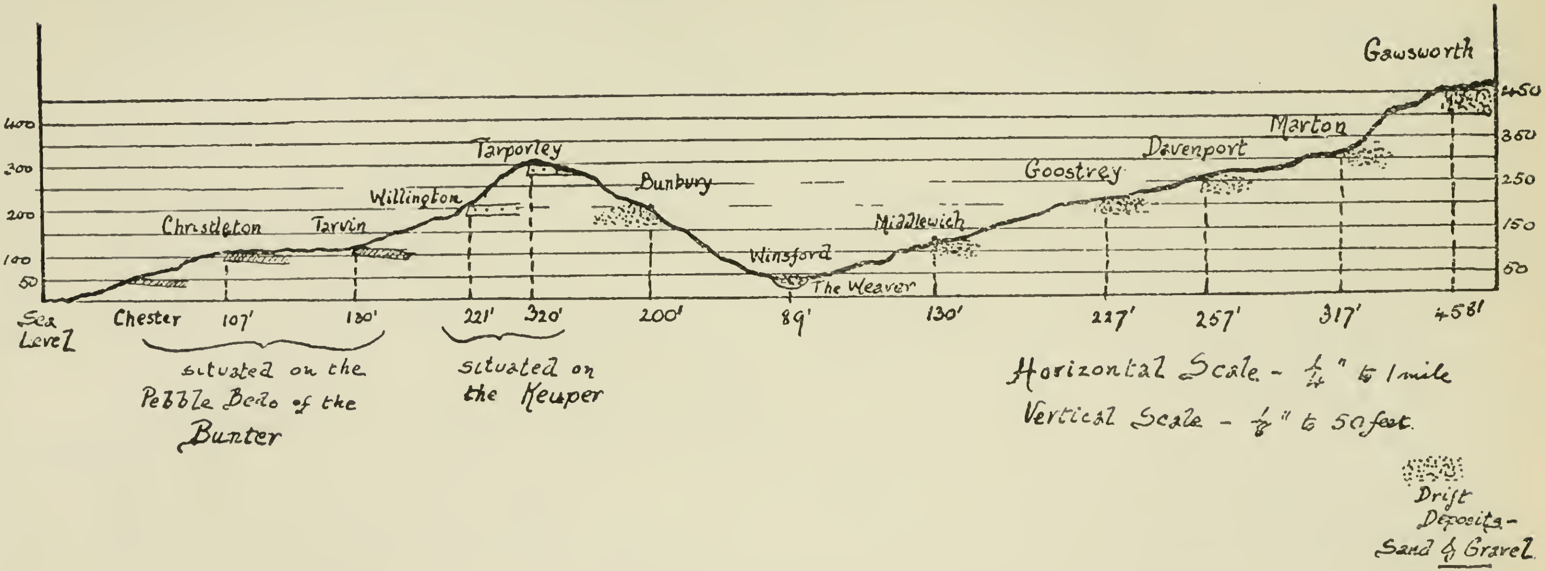
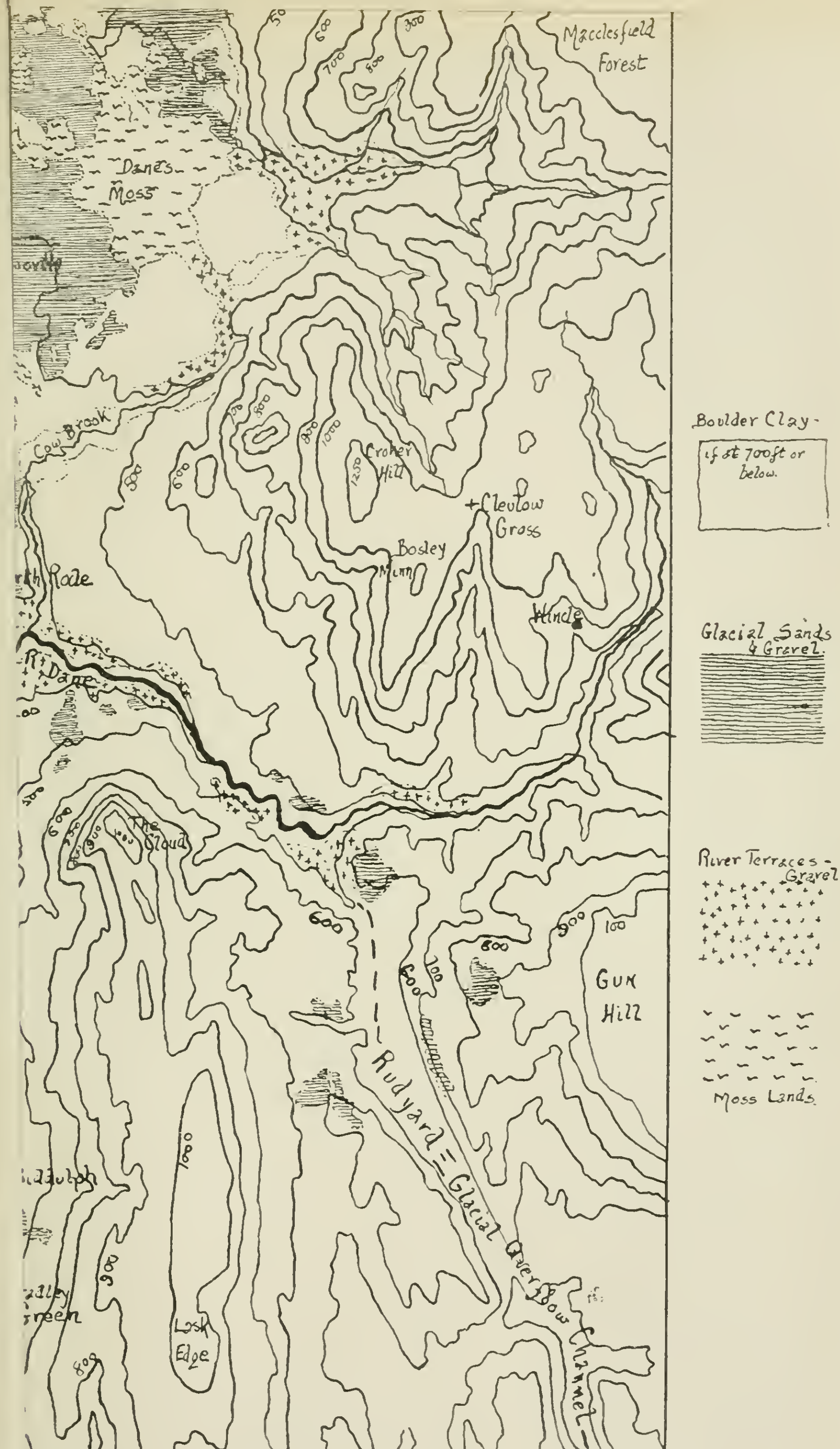


Diagram 4.

Section across the Village Lines of the Cheshire Plain from Chester to Gawsworth (Macclesfield).

varies in thickness—44 ft. near Macclesfield Asylum, 5 to 50 ft. in the Wirrall, and 66 ft. at Burscough Bridge. There are many parts where it has filled up the pre-glacial valleys in the Triassic plain, where the thickness is much greater; at Heatley a boring reveals a depth of 200 ft., at Widnes 163 ft., at Hooton a boring of 169 ft., and at Ellesmere 90 ft. The retreat of the ice was accompanied not only by a recession of the glacial front, but also by a gradual thinning of the ice sheet, and when this had proceeded to a certain point there was formed a series of glacial lakes along the Cheshire uplands between the hills and the ice; these drained into one another and ultimately through the Congleton anticline at Rudyard at an altitude of approximately 600 feet. This broad glacial valley cuts completely across the watershed between the Mersey and Trent, and partakes of the character of many glacial valleys in this respect. There are several within the area, and as they are frequently used to-day as highways, settlements have been established in some of them where the other factors necessary for human occupation were present. Thus, Rushton-Spencer, Rudyard, Bosley and Leek in the Rudyard Gap; Disley, Pott-Shrigley, Rainow and Chisworth in other and similar gaps. A further retreat of the ice would cause a lowering of the lake level and the abandonment of the higher overflow channels. The Rudyard Gap was now above the surface of the lake, and the water found an outlet at a lower level at Madeley, 352 ft., afterwards at Market Drayton, 254 ft., and finally by the gorge at Ironbridge, south-east of Shrewsbury, 160 ft. The erosion at this outlet lowered the lake sufficiently to divide it into two parts along the present watershed between the basins of (1) the Dee and Mersey on the one hand, and (2) the Severn on the other. Prior to the abandonment of the Rudyard Gap the ice had laid down a mass of clay, sand and gravel along a line parallel to the axis of the high land. Here occurs the highest line of settlement on the plain at Macclesfield, Gawsworth and Tytherington. Further stages in the retreat of the ice sheet and the lowering of the surface of the lake are found in the formation of terraces of sand and gravel at lower and lower elevations, as shown in sectional diagram. Between the lines of the deposits moss-lands occur, such as Mossley Moss, near Congleton; Spenmoss, Brookhouse Moss, east of Sandbach; Lindow Moss, near Wilmslow; and Danes Moss, the largest



Terraces and Mosses. Village

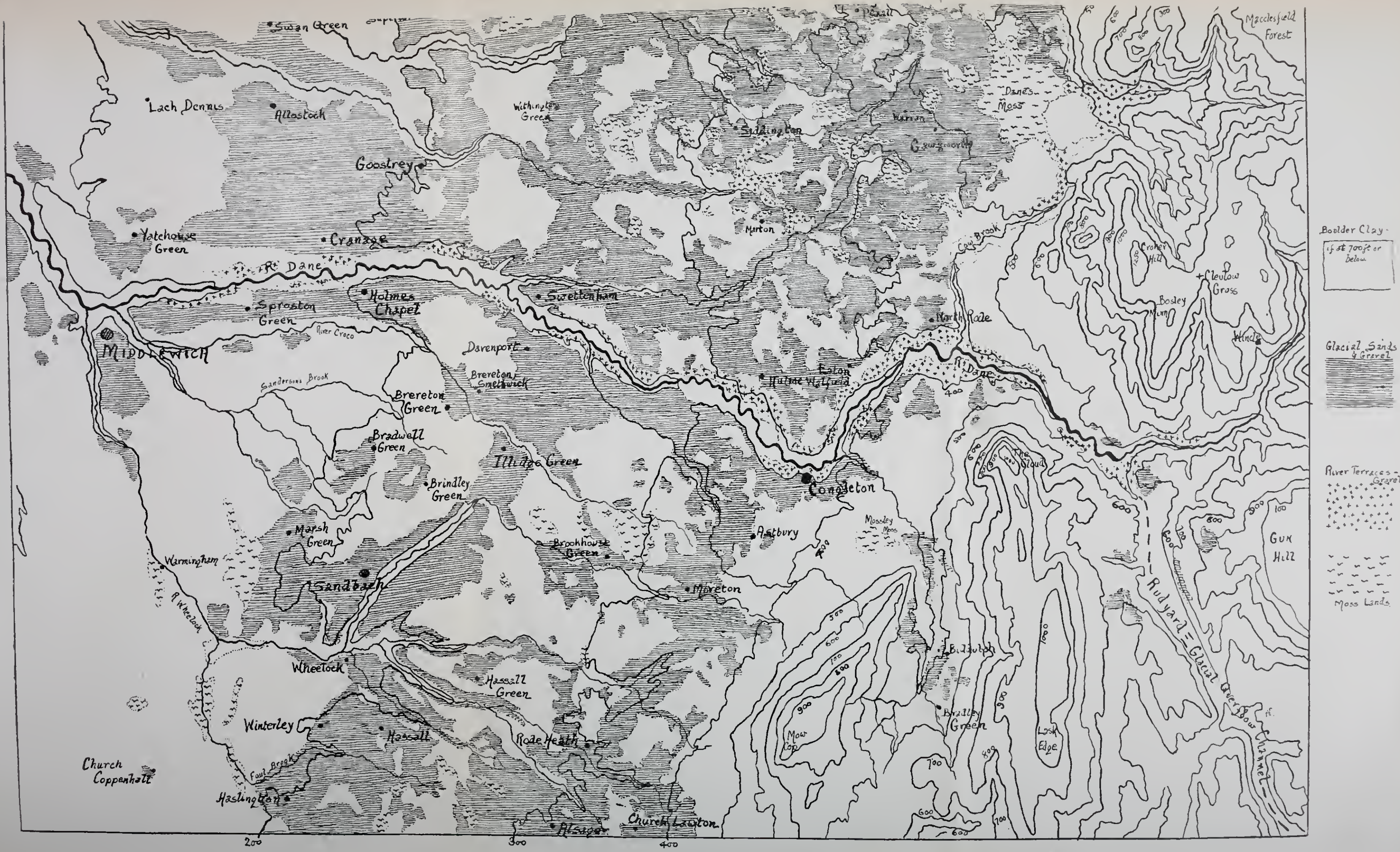
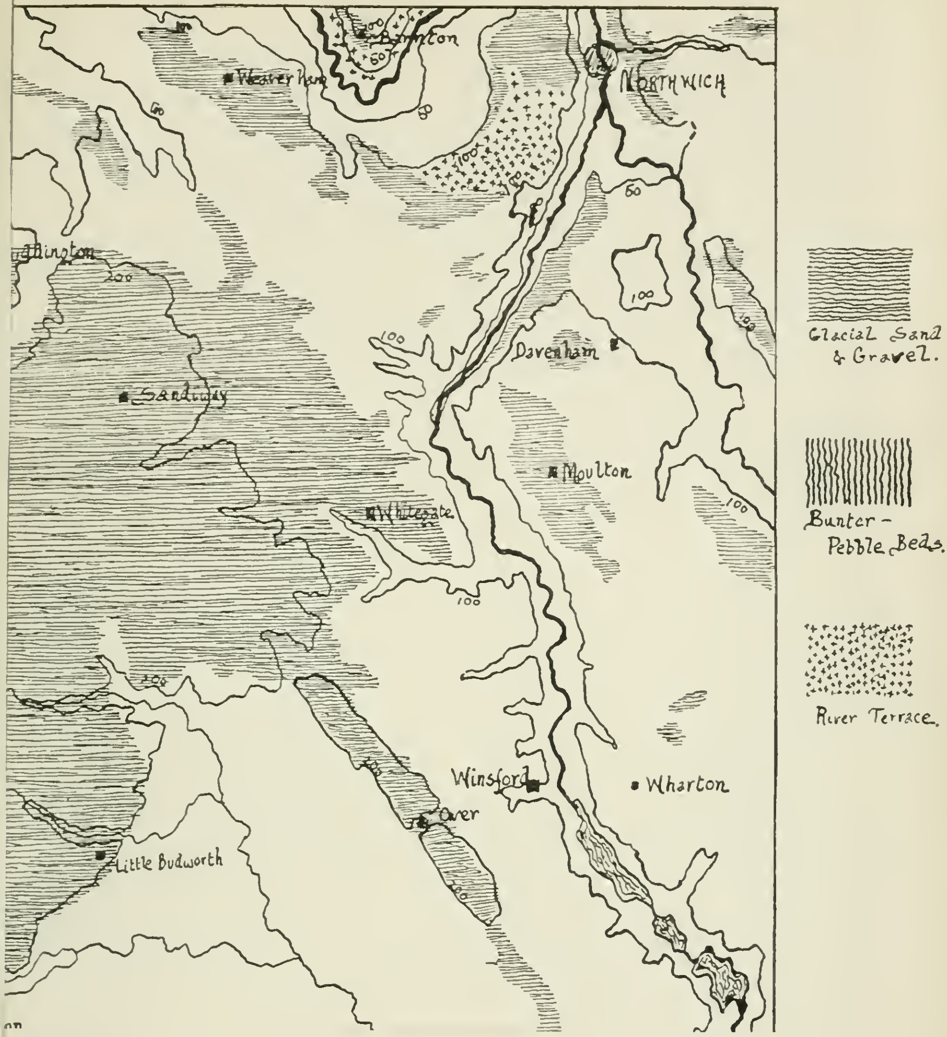


Diagram 5. Part of Eastern Portion of Cheshire Plain, showing Deposits of Glacial Sands and Gravel, the Gravel Terraces and Mosses. Village Settlements are mainly on the Sands and Gravel.


Weaverham
Barnton
NORTHWICH
Davenham
Sandiway
Whitegate
Moulton
Winsford
Over
Wharton
Little Budworth
50
100
200
Glacial Sand & Gravel.
Bunter - Pebble Beds.
River Terrace.

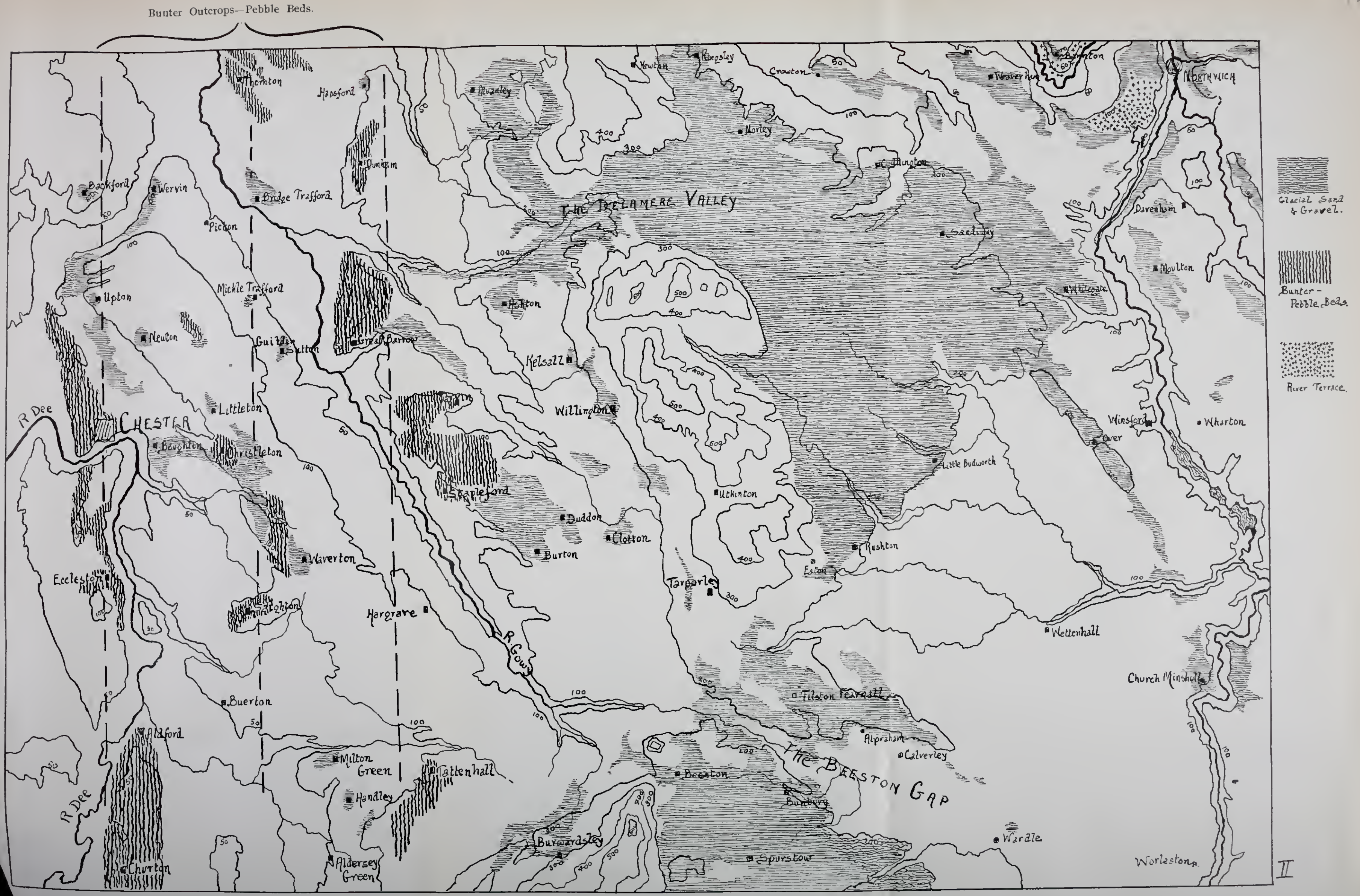


Diagram 6. The Western Portion of the Cheshire Plain—showing the Deltaic Deposits at the Delamere Valley and the Beeston Gap and the Outcrop of the Bunter Pebble Beds to the West of the Peckforton Escarpment. The Positions of the Villages are determined by these two Formations.

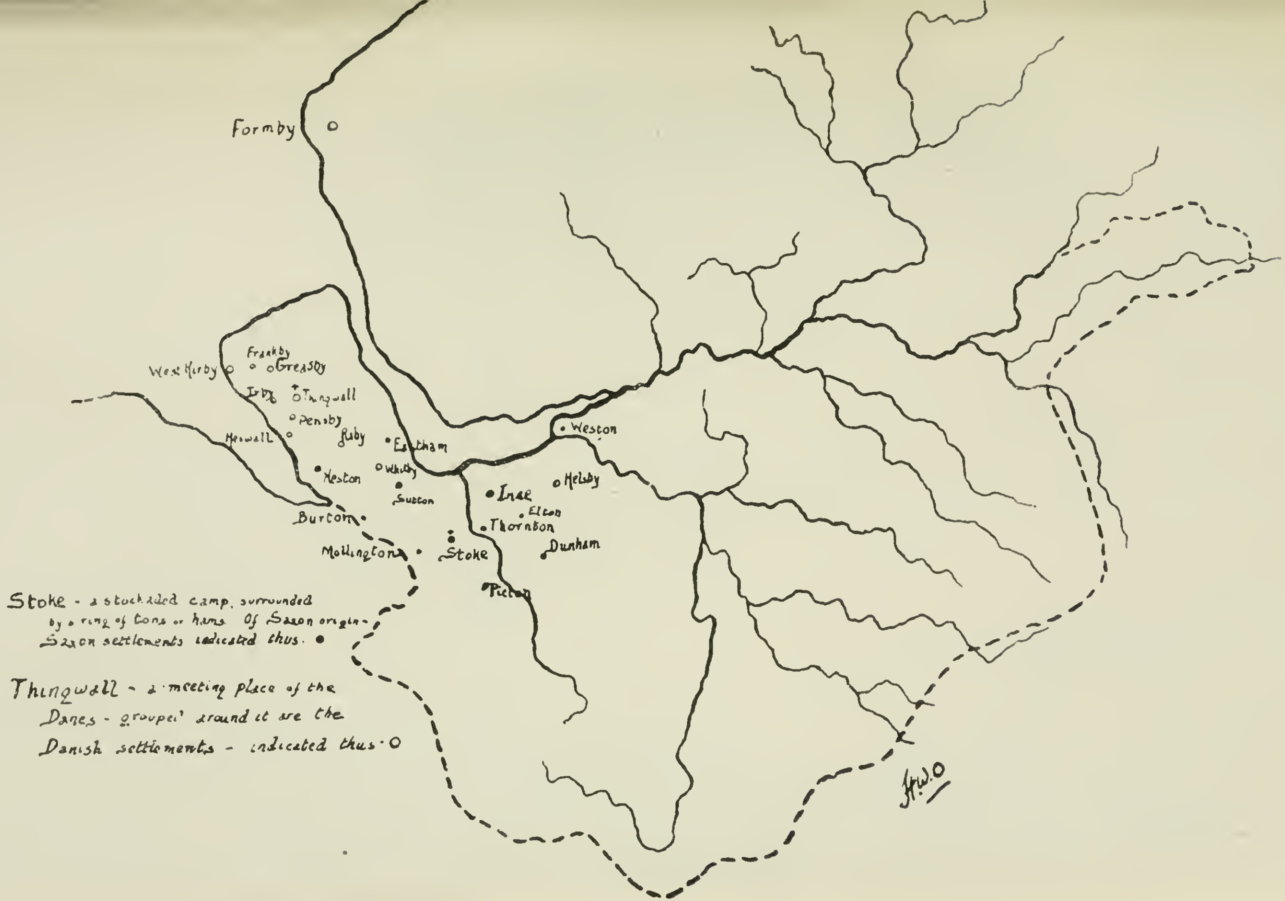

Formby
West Kirby
Frankby
Greasby
Irby
Thingwall
Pensby
Heswall
Raby
Eastham
Whitby
Heston
Sutton
Burton
Mollington
Stoke
Weston
Helsby
Ince
Elton
Thornton
Dunham
Picton
Stoke - a stockaded camp. surrounded
by a ring of tons or hams Of Saxon origin -
Saxon settlements indicated thus. ●
Thingwall - a meeting place of the
Danes - grouped around it are the
Danish settlements - indicated thus ○
H.W.O

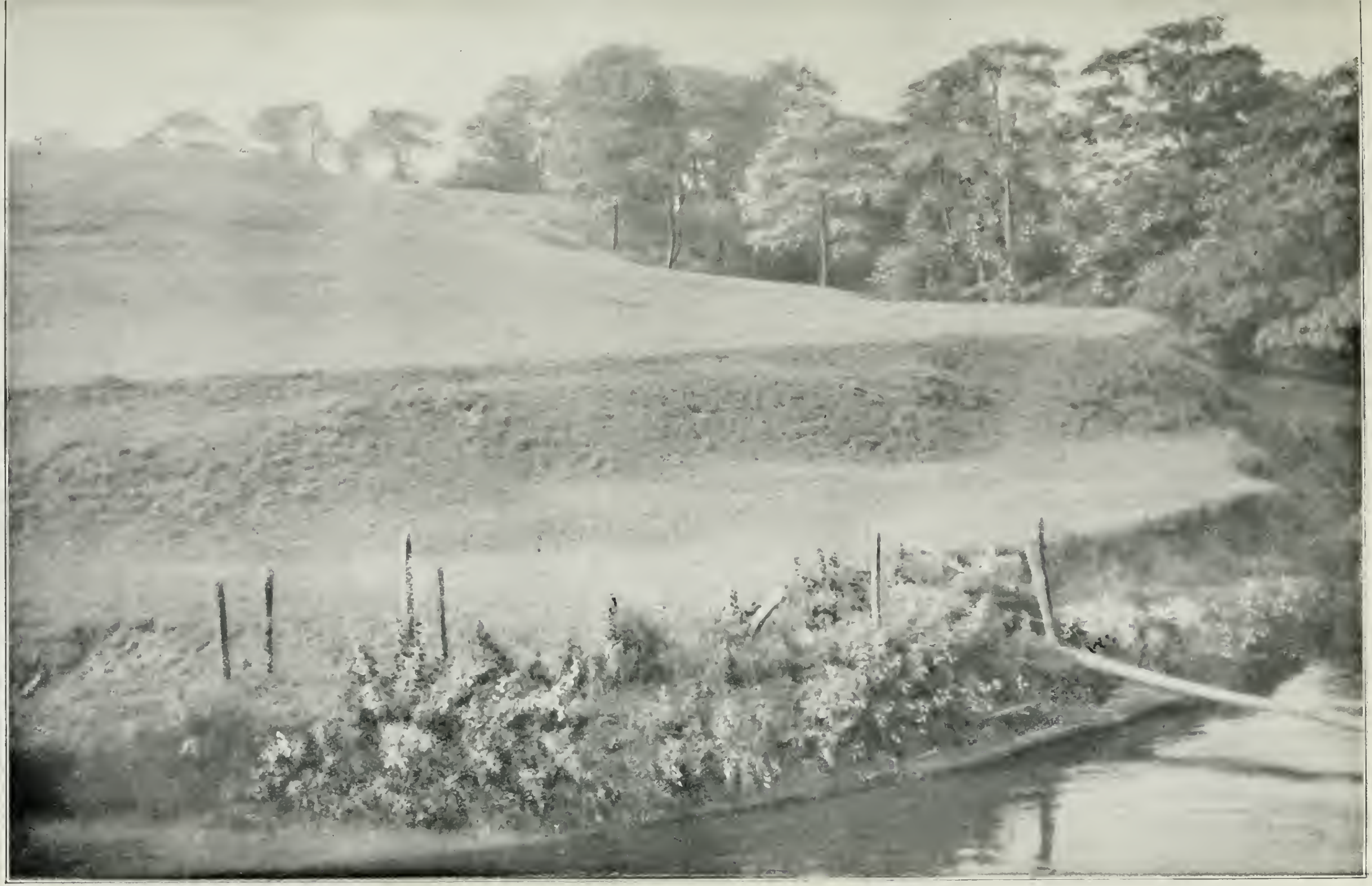
Diagram 7.
The Danish and Saxon Settlements in the Wirral and its Neighbourhood

of all, near Macclesfield. On the sand and gravel deposits the village settlements are situated. Thus are established the village lines on the east of that portion of the Cheshire Plain bounded by the Keuper Basement Beds of the Peckforton Hills and drained by the Weaver. When the Cheshire lake had sunk to the 300 contour and the ice had retreated to the western side of the Peckforton Hills, the outflow poured through the Delamere Valley at the north and the Beeston Gap at the south, forming large deltaic masses of sand and gravel. These are of the usual shape and of great depth, with a gradual slope to the east from the 300 to the 200 contours, and then a steep slope to the plain along the edge of the deltaic mass. This forms a most retentive layer for water, and along its edge springs gush out. Here are the villages of Rushton, Little Budworth, Cuddington, Whitegate, Kingsley, Sandiway, and Norley. The soil generally was poor and covered with heaths and peat mosses. Settlements were non-existent, not for lack of water, but because of Nature's poor return to man's labour in agriculture. Delamere Forest and the surrounding neighbourhood has been forest land for centuries, until in the nineteenth century the practice of marling succeeded in reclaiming large portions.

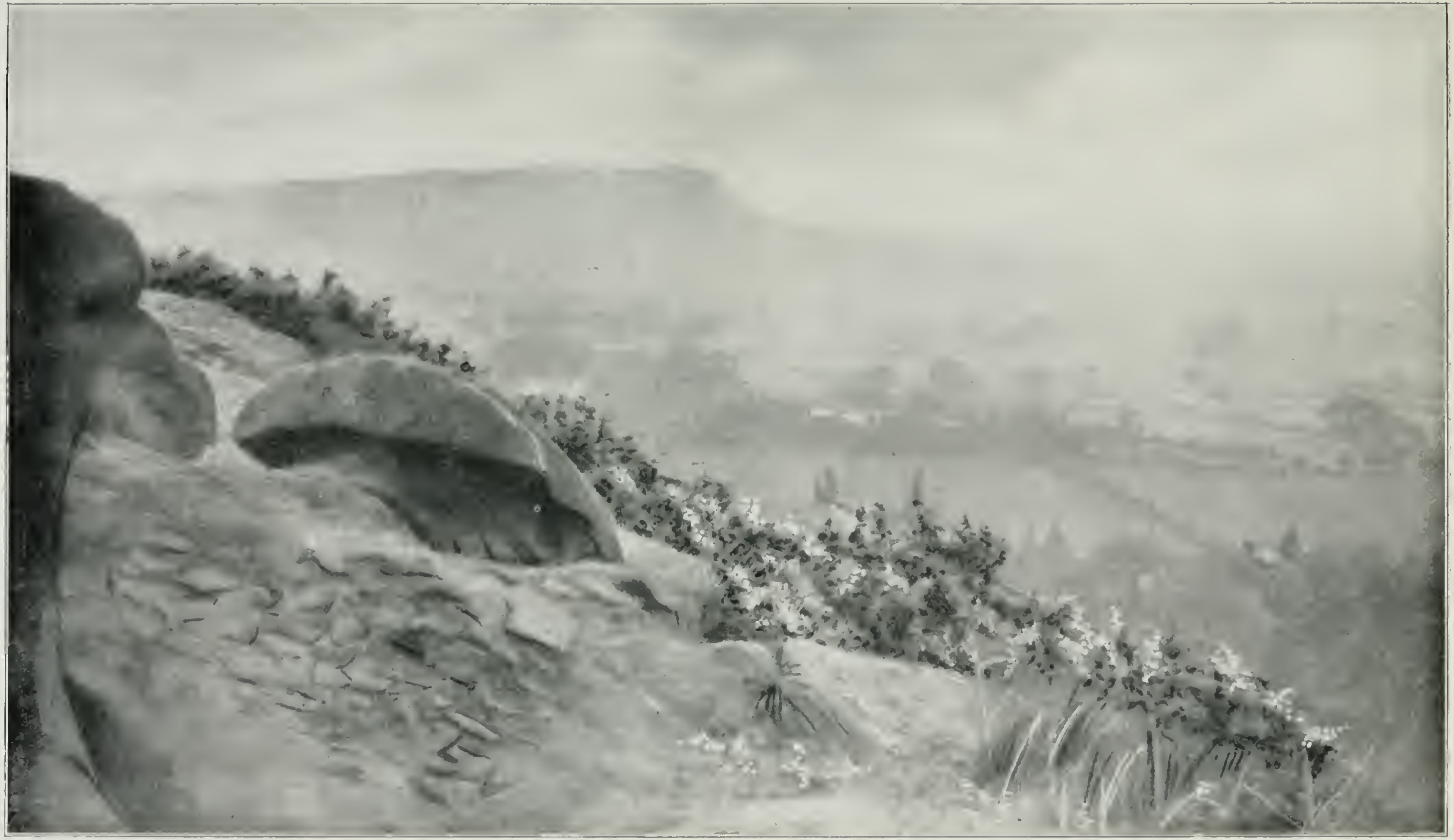
To the west of the Keuper escarpment glacial sands and gravels are found in isolated patches, and wherever they occur the site is occupied by a village; there are, however, many communities not on such formations, and the reason is perhaps to be found in the presence at or near the surface of the Bunter Pebble Beds and Bunter Sandstone, prolific water-bearing strata with a general north-south strike. The village lines assume the same general direction, and, as there are three outcrops of the Bunter either horizontal or gently inclined eastwards, there are three well-marked village lines:

(1) Chester, Eccleston, Aldford and Churton.
(2) Christleton and Saighton.
(3) Dunham, Tarvin, Stapleford and Tattenhall.

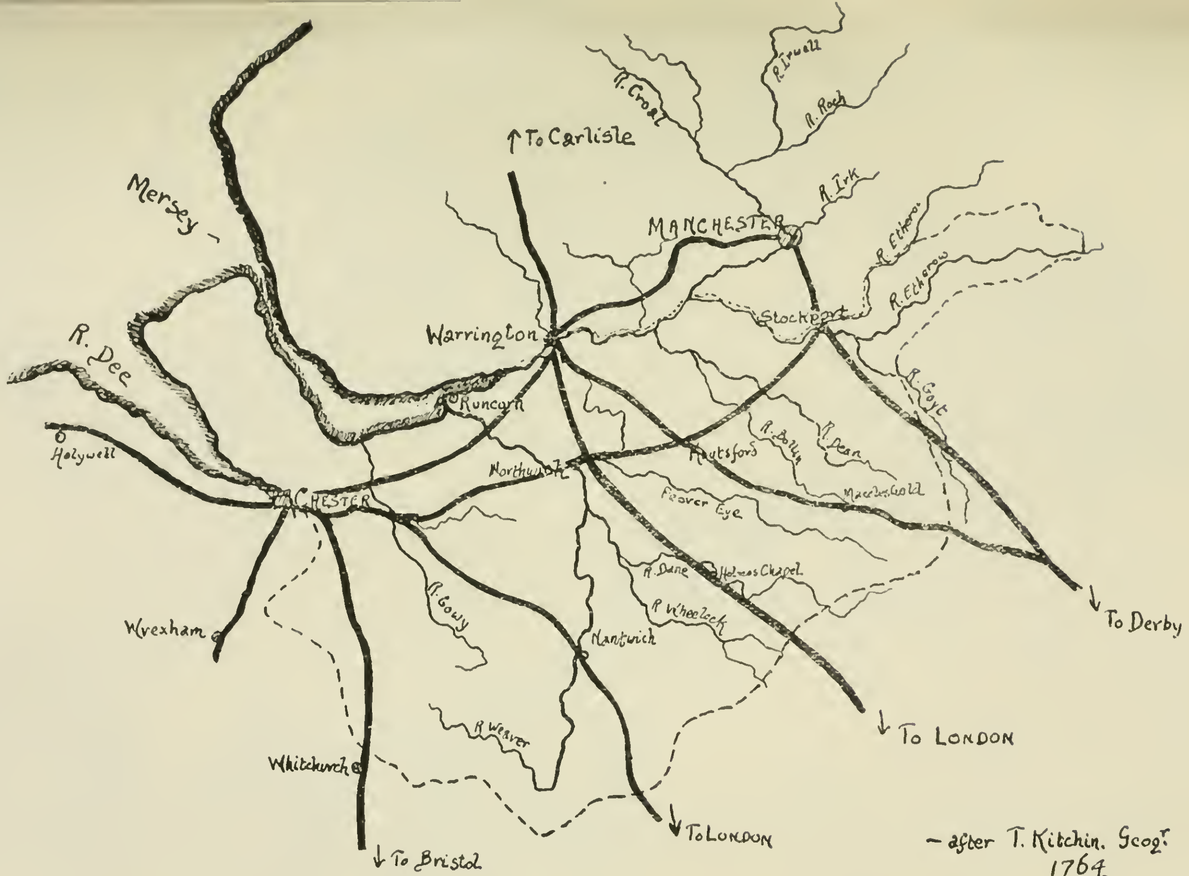
A study of the Wirral will now be an easy exercise, as here both causes are manifest in the arrangement of the settlements. The Danish settlements are grouped around Thingwall, on Deeside, the Saxon along the north of the Wirral, on Mersey-side, and around Stoke on Gowy. Where-ever they occur they are found on glacial sands and gravels



River Terraces on the Bollin.—No. 8.

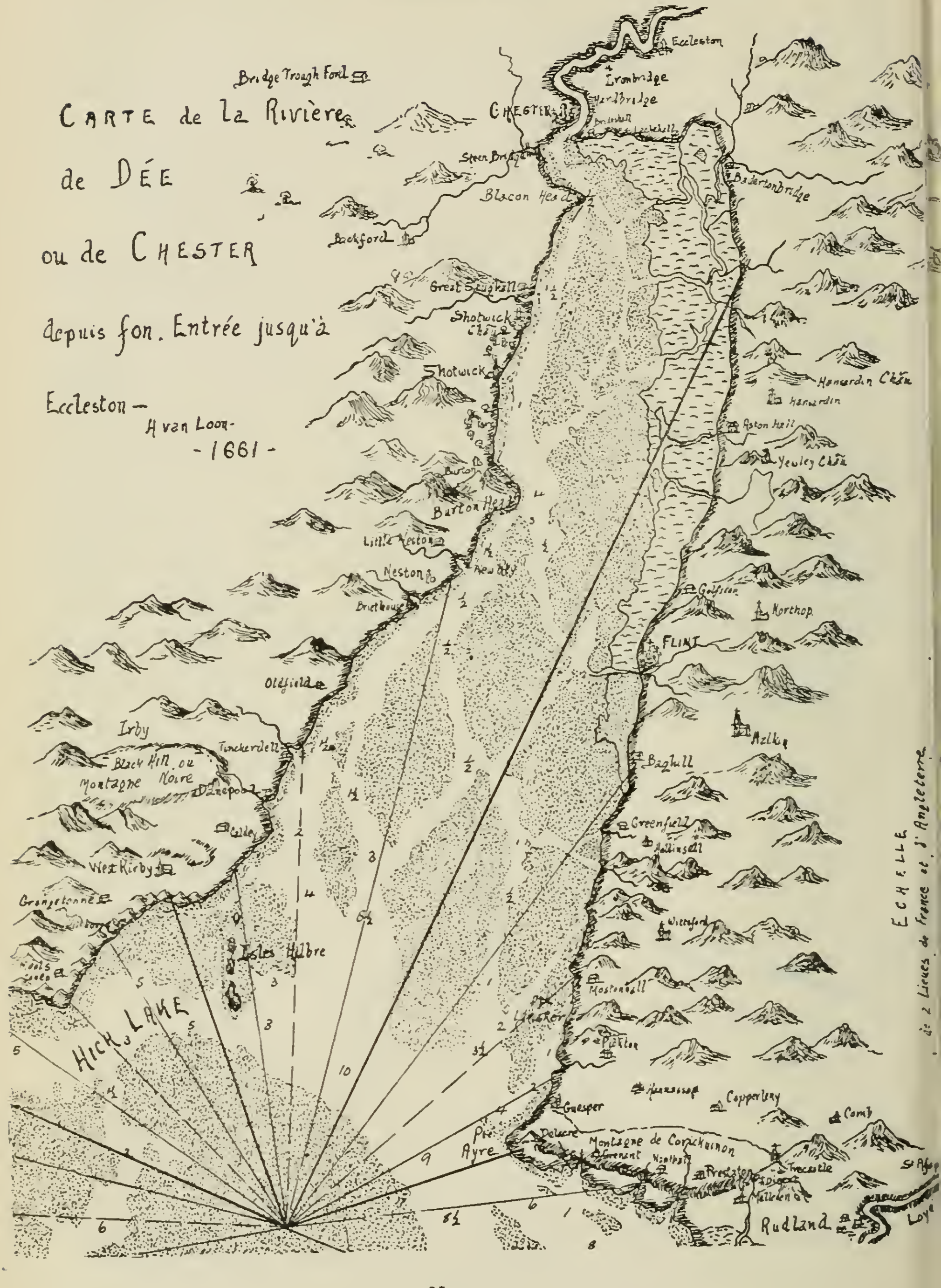


Helsby Hill near Frodsham.—A part of the Triassic Ridge that surrounds the Cheshire-Plain.—The beds dip S.E. at an angle of 7° towards the middle of the Plain.—At the right to the north is the Mersey.—No. 9.

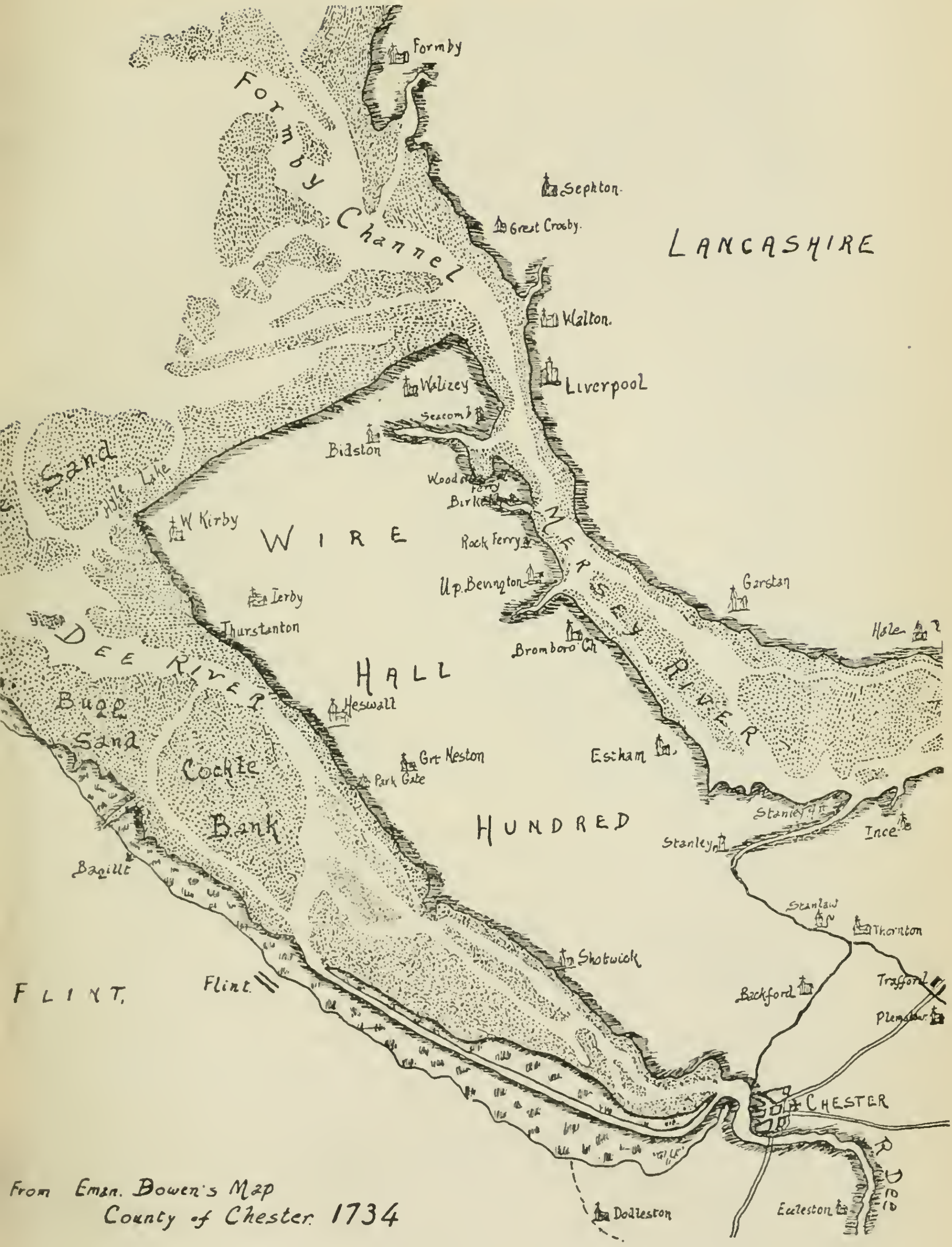


—after T. Kitchin. Geogr. 1764.

No. 10.—Cheshire.—Post Roads and Principal Cross Roads directed to the Port of Chester and the Bridge Heads on the Mersey at Warrington and Stockport.


Carte de la Rivière de Dée ou de Chester depuis son. Entrée jusqu'à Eccleston —
H van Loon
- 1661 -
Bridge Trough Ford
Eccleston
Ironbridge
Hardbridge
Chester
Steen Bridge
Blacon Head
Backford
Badertonbridge
Great Saughall
Shotwick Châu
Shotwick
Hanerdin Châu
Hanerdin
Aston Hall
Yeuley Châu
Burton
Burton Head
Little Neston
Neston
Bretthouse
Golfton
Northop
Flint
Oldfield
Irby
Black Hill ou Montagne Noire
Tinckerdell
Dawpool
Calley
West Kirby
Grangetonne
Azlkig
Baghill
Greenfield
Hollinsall
Wittford
Isles Hilbre
Hick Lake
Mostonhall
Pickton
Guesper
Copperlary
Comb
Pte Ayre
Delecre
Montagne de Corickninon
Trecastle
St Asaph
Prestaton
Melleden
Rudland
Loye
Echelle de 2 Lieues de France et d'Angleterre

No. 11.



From Eman. Bowen's Map
County of Chester 1734

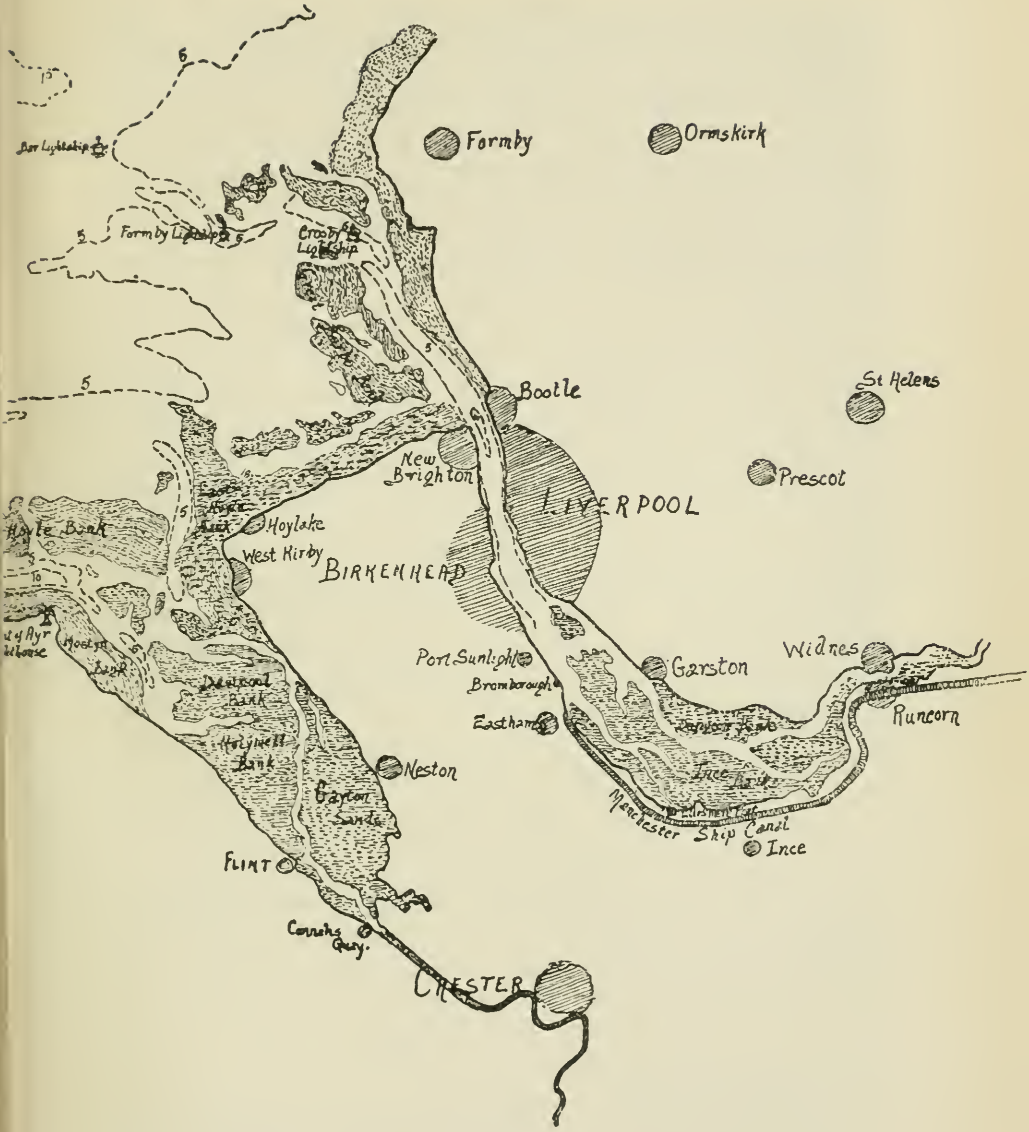
No. 12.

or on the outcropping Bunter—the exception Stoke, the stockaded camp of the Saxons, being close to the marshes of Gowy.

As the ice sheet receded from the plain the upland waters were free to flow over a more extensive area down to the glacial lake. Every stream began to carve out for itself in the boulder clay and other deposits a deeper and deeper channel, which resulted in the formation of a series of terraces at lower and lower levels. These are well marked on the majority of Cheshire streams, and are some indication of the amount of river erosion during post-glacial times. The general trend of these terraces is towards the north-west, in the direction in which the ice was retreating and towards the lowest points at the Dee and Mersey estuaries. Thus there is a parellelism of village settlements in a northwest-southeast direction, and these, together with the northeast-southwest series already studied, give that criss-cross arrangement at once observed on any ordinary road map of Cheshire. The largest post-Glacial river terrace of all is that of the Mersey, and on the south side, wherever peat mosses do not interfere, there is an east-west line of settlements from Stockport to beyond Warrington, including Northenden, Baguley, Sale, Ashton-on-Mersey, Carrington, Partington and Warburton. On the north side, in Lancashire, there is a similar line of settlements, including Heaton Moor, Didsbury, Chorlton, Stretford, Urmston, Flixton, Glazebrook, Padgate and Penketh.

There is a group of communities along the Weaver, some on the river terraces and some on the clay plain. These are in the salt area—a synclinal fold with its axis running northeast-southwest. Salt has been obtained here since the Romans founded Middlewich and called it Condate. Other places are Wharton, Minshull-Vernon, Lach Dennis, Winsford and Northwich. The deposition of salt occurred long before the glacial period in the inland drainage area of the Triassic times. The lips of this great fold form bold features in the landscape of Cheshire to-day in the red rocky escarpments at Helsby, Frodsham and Beeston.

There remain yet the settlements along important lines of communication, and of these there are at least four, three of which are bridge-heads and one at a point where land and sea communications meet. In post-glacial times Lancashire



No. 13.—The Estuaries of the Mersey and the Dee.
(Comparison for purposes of navigation.)
From a Modern Ordnance Map.

and Cheshire were severed by a broad and impassable tract of marsh-land and soft alluvium along the line of the Mersey. There are, however, two points where such a barrier could be crossed—Warrington, where the sandstone of the Pebble Beds rose above the marsh, and Stockport, where the Permian sandstone also gave a secure foothold. All the north-south lines of communications made for either of these two places, and almost all roads in north Cheshire to-day are directed towards Warrington. Nantwich is in a similar position on the Weaver.

The fourth of these settlements is Chester—THE port, along with Bristol, on the west of England until the eighteenth century, when Liverpool arose and completely overshadowed it. The series of maps illustrate how the Dee has silted and made Chester an inland town. The sailing chart of 1661 shows an open channel as far as the city; the eighteenth century map of Bowen's, nearly 80 years later, shows the attempt made by the citizens to maintain the position of their town as a port by the construction of the Cut. A modern Ordnance map shows at once why Chester has decayed and Liverpool taken its place. In conclusion, the agencies at work in determining the sites of human settlements have been predominantly physical, consisting of—

(*a*) Glacial deposits of sand and gravel.
(*b*) Post-Glacial river terraces.
(*c*) Triassic formations of the water-bearing strata.
(*d*) The existence of salt deposits.

At a later time, when transport became an important factor in human relationships, sites at bridge-heads and at land and sea terminals developed more than others.

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# THE DISTRIBUTION OF POPULATION IN SOUTH-WEST LANCASHIRE: ITS SOCIAL SIGNIFICANCE.

By H. King, B.A.

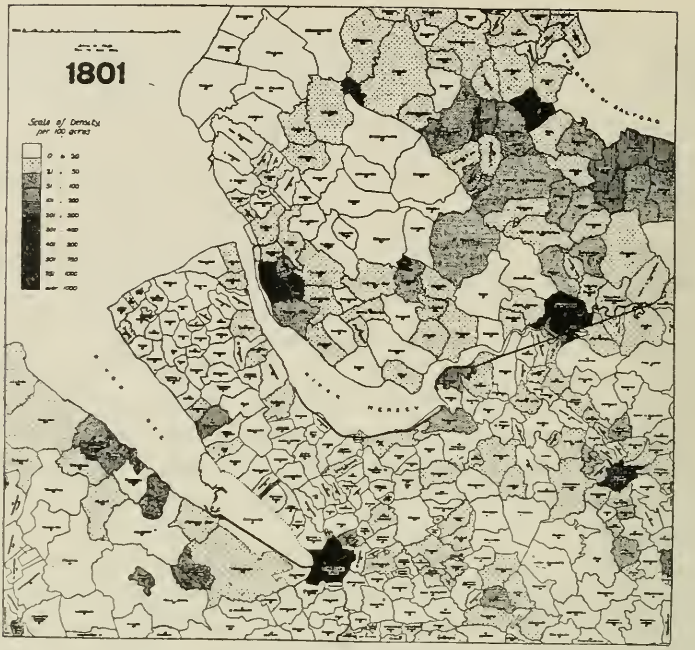
(Delivered to the Study Circle, January 29th, 1924.)

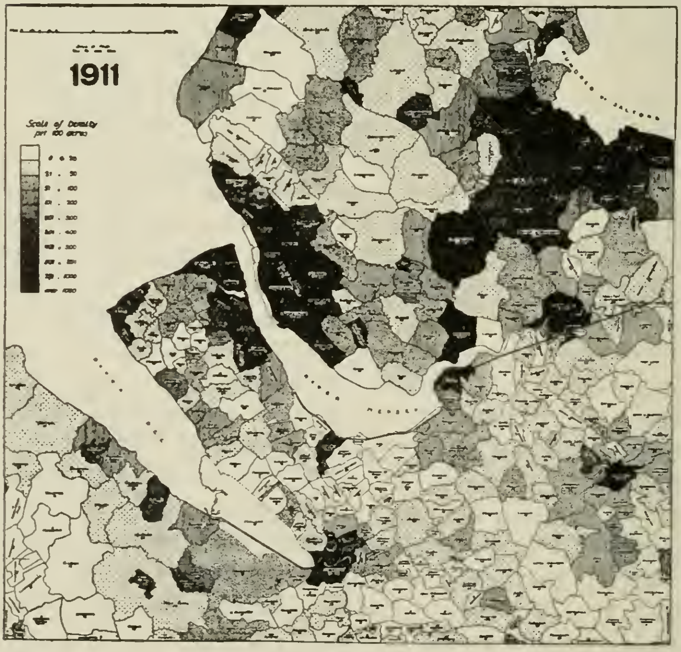
It is intended in this article first to discuss briefly the factors which have led to the existing distribution of population in South-West Lancashire, and then, by indicating certain modern tendencies in development, to outline a few of the problems which appear to be of vital concern both to Liverpool and to the Manchester regional planning area.

The map showing the distribution of population in 1911 suggests a division of South-West Lancashire into a number of regions which it will be convenient to use as a basis for discussion.

(1) In the East appears a densely peopled area which exhibits a tendency towards concentration on the line of townships extending from Orrell to Leigh, where the coal measures are most productive. There is a secondary concentration from St. Helens westwards, again chiefly on account of the distribution of coal, although there are present several contributary factors. Of these the most important is their position with reference to that level but narrow neck of land between the River Alt and Ditton Brook on which have always been focussed the land communications with Liverpool.

(2) Liverpool forms another distinct sub-division, and with it must be taken the densely peopled area on the Wirral shore of the estuary, as far as and including Port Sunlight, since this district is an essential part of the port. The excellent natural site of the Great Float remained undeveloped until improvements in transport towards the middle of last century made possible the efficient distribution of imported raw materials and effected the necessary intimate contact with the business heart of the port on the opposite shore. On the accompanying map for 1801 there is no trace of Birkenhead, as then the river, on which that town's prosperity is now essentially based, still formed an effective barrier to communication with England's industrial centres. The entire lower portion of the estuary, which it might be convenient to designate "Merseyside," possesses unique facilities for the


1801
Scale of Density per 100 acres
0 - 20
21 - 50
51 - 100
101 - 200
201 - 300
301 - 400
401 - 500
501 - 750
751 - 1000
over 1000
MERSEY


1911
Scale of Density per 100 acres
0 - 30
31 - 50
51 - 100
101 - 200
201 - 300
301 - 400
401 - 500
501 - 750
751 - 1000
over 1000
MERSEY

success of such industries as flour milling, sugar refining, oil extracting, tobacco manufacturing, and all branches of engineering.

(3) In the upper Mersey estuary there has grown up the alkali industry, now so important to almost all the key industries of Lancashire. Historically, this industry was here based on the facilities enjoyed by Runcorn and Widnes for assembling the necessary raw materials. Pyrites could be brought up the Mersey from Spain, coal from St. Helens by the Sankey Canal, and salt from Northwich by the Weaver Navigation, and the two towns also command the most westerly railway crossing over the Mersey. During the past thirty years the alkali industry has expanded considerably and other prominent industries have arisen in the district which now enjoys an additional advantage in the Ship Canal.

(4) The last big sub-division is that of the agricultural belt of South-West Lancashire which forms a semi-circular zone of thinly peopled land separating the above-mentioned regions, and broken in only two places where lines of communication have attracted denser settlement. A comparison of the two population maps will show that this belt has been a cardinal feature throughout the century, and it is a matter of the utmost importance to the whole of South Lancashire that every effort should be made to prevent its inundation by industries and dwelling-houses. Agriculturally it is arable land of the very finest quality, but it is for the most part unsuitable for building purposes and should be retained as a kind of buffer between the more densely settled regions which surround it.

## SOME SOCIAL ASPECTS OF NINETEENTH CENTURY DEVELOPMENT.

(1) Throughout the greater part of the Nineteenth Century the utilisation of the region under consideration was left to the tender mercies of the law of *laissez faire*, and from the point of view of the social well-being of the communities concerned the results are admittedly very far from satisfactory. It is true that Liverpool's docks and warehouses and many of its heavy industries now occupy land which was formerly marsh, a physical condition which has contributed to a great extent to Liverpool's success in keeping pace in the matter of

accommodation with her increasing trade. But the port grew up at a time when communications were not very far advanced, and in order to save fatiguing and uneconomical journeys between work and homes, the latter were crowded near the centre of the city, and the dry sandstone plateau above the Mersey, pre-eminently a building site, was encumbered with endless rows of indifferent property. Great efforts have been and are being made to repair this disaster, and the workers are now being carried outwards in all directions by excellent communications to Wirral, to the dune coast north of the city and radially towards the agricultural zone; but large areas of the plateau are still covered by masses of houses, with totally inadequate provision of open spaces. Owing to this development modern Liverpool has a legacy from the past of difficult and vital though not insoluble social problems in addition to the special problems which have arisen out of the presence of vast quantities of unskilled and often casual labour. This applies equally to the Wirral portion of Merseyside.

(2) In the mining and industrial districts to the east, the "conurbations" are not of such great extent nor is the problem of open spaces so critical. The haphazard development of these districts is nevertheless patent in many other respects. In each township there are several nuclei, joined by roads lined with houses, a feature which creates special difficulties in organisation and administration in so far as it prevents the growth of a united local sentiment. In addition the industrial districts are faced with an ever-increasing trouble in the form of mining subsidences, which are particularly acute in the Douglas and Glazebrook Valleys, and which cannot be removed by individual action.

(3) The difficulty of divided interests is also experienced in the agricultural townships of Lancashire, although here it is a direct result of environmental control. With perhaps certain exceptions near Liverpool, settlements appear to have taken the form of small hamlets either in forest clearings or on the drier bosses of boulder clay in the moss area, two or more being contained in each township. The townships are consequently fundamentally different from the nucleated townships typical of the Midland Counties.

Happily the course of expansion has not gone sufficiently far to make the situation entirely irretrievable, although the increasing density shown by the population map in most of the rural townships served by railways indicates a real danger in that direction. There is still a fairly wide though ever-diminishing agricultural zone between industrial Lancashire on the one hand, and Merseyside and the Ship Canal zone on the other. The fate of Wirral, the central portion of which is still largely agricultural, is decidedly in the balance owing to the very natural desire of the more fortunate Merseyside workers for a share in its amenities. These amenities will, however, rapidly disappear in the absence of a firm control exercised by a body which has in mind the interest not of a particular individual or corporation, but of the region as a whole. It is not urged that individuals cannot make the best possible use of a particular site, because settlements such as Port Sunlight are models of what industrial districts can be. Unfortunately such models are rare and the organised effort which is necessary to prevent the desolation of the relics of our beautiful countryside is likely to enlist the sympathy and co-operation of individual benefactors like the founder of Port Sunlight.

## TENDENCIES OF MODERN DEVELOPMENT.

It would perhaps be germane to this article to sketch the lines of probable development in our area, pointing out what is being done in each case in the way of organised effort to utilise the land in the best possible manner.

(1) In the Industrial area important changes in the coal-mining industry are clearly discernible. For some years the centre of the maximum production has been moving from Wigan in two directions—eastward towards Abram, Tyldesley and Leigh, and to a less extent northwards towards Coppull. The movement was masked somewhat by the artificial conditions obtaining during the war, since when several collieries to the west of Wigan have ceased operations. The general shortage of houses precluded migration to the more productive measures, and large numbers of miners are now compelled to travel to their work by train, a factor which has a twofold significance. It relieves the new producing areas of a pressing need to supply accommodation on a large scale, and, by eradicating to some extent the tendency of all mining populations to migrate to the immediate source of work, it

should, *ceteris paribus*, encourage the erection of more attractive dwelling-houses.

(2) It seems inevitable that Liverpool must continue her eastward encroachment upon the valuable agricultural belt. The authorities have undoubtedly learnt the lesson of the past and are avoiding overcrowding in all new enterprises, while the new avenues in the suburbs leave nothing to be desired. The city is, however, pursuing an individual scheme of development, and the preservation of the open agricultural belt is now an urgent problem which demands joint action on the part of all the public authorities in South Lancashire. Economically the area west of the Pennines and bounded on the north and south by the Ribble and Mersey respectively is essentially a well-defined portion of a larger economic and social unit, and the co-operation of all the component parts is a prerequisite of the efficient administration of the whole in the interests of the present and future inhabitants of South Lancashire. The competition existing between the different parts is more apparent than real, but may, nevertheless, attain in men's minds a significance out of all proportion to its actual importance. The concentration of Liverpool on the development of efficient arterial roads, a policy which amounts in practice to the subsidising of road transport, is perhaps the outward expression of the capture by Manchester of the local markets for certain commodities, the factor of distance having placed Liverpool under a considerable disadvantage which her authorities now wish to eliminate. While such rivalry, by creating a stimulus towards efficiency, is admittedly beneficial up to a certain point, it is nevertheless possible to carry it too far, as has often been the case in America, and it would seem more reasonable to initiate immediately a joint enquiry as to whether the region as a whole is being best served by this procedure. The urgent need for joint action in the near future is infinitely more crucial than the causes of local contention, and if the matter is not voluntarily undertaken the authorities will ultimately be compelled to take such action by sheer force of circumstances.

A step in the right direction has recently been taken by the organisation of a joint policy on the part of the Urban Districts of Little Crosby, Great Crosby, Seaforth, Waterloo and Litherland, and the Rural District of Sefton, which extends its authority over that part of the agricultural belt which is contained in the valley of the Alt. It is hoped that this commendable initiative marks the beginning of an early and all-embracing co-ordination.

A further extension of heavy industries is sure to take place in the near future in western Merseyside, and, in spite of the intervening mile of open water, Liverpool's smoke problem will be adversely affected. Residential Wirral in its turn would suffer in the event of the development of heavy industries on the Dee below Chester, and the Wirral Joint Town-Planning Committee is likely to co-operate with the Deeside authorities with the idea of avoiding this danger as far as possible. No matter from what angle the problem is viewed, co-operation over very wide areas appears to be the only means of obtaining satisfactory development.

(3) Perhaps the most critical case for control is the region served by the Manchester Ship Canal, the seaward end of which has already obtained considerable industrial prosperity. Almost throughout, the Lancashire side of this zone is low-lying and, although admirably suited to heavy industries, transport and agriculture, it is totally unsuited to the erection of satisfactory settlements, as the monotonous, bleak and treeless aspect of the new Warrington suburbs adequately testifies. As Manchester is approached the problem of control becomes more acute, because in the Chat Moss area there are wide spaces of reclaimed land of great agricultural value which should be retained as a buffer between the Leigh district and the industrial canal zone. The old evils of uncontrolled development are already asserting themselves at Cadishead, where a large and pleasant settlement had its only prospect—that of the beautiful Warburton-Lymm "ridge"—totally obscured by the selection of the lower Glazebrook Valley as the dumping-ground of the Irlam Ironworks. Only one or two smoky industries are required on its Warrington side to transform Cadishead into a new example of the kind of indiscriminate and haphazard industrialisation which characterised most of the Nineteenth Century, but which one had hoped was now repudiated.

The Cheshire side of the canal zone presents a far more pleasing contrast. Its hilly nature will prevent any large-scale movement of transport, but this very factor enhances its suitability for building sites. Cheshire has also the additional advantage of lying to windward of the smoke from any factories which may be erected near the canal, but intimate co-operation will be necessary if the land is to be developed for the purpose for which it is by nature best endowed.

The social and economic possibilities of the large zone of the canal constitute a challenge to the authorities concerned. If they acquiesce in ungoverned development the district will undoubtedly be marred and will involve surrounding areas in its desolation. Most of the zone already comes under the control of the Manchester regional planning authorities, and the almost virgin area affords an unique opportunity for the creation of an ideal industrial region which would for many generations remain a monument to concerted effort, if such can be achieved.

# THE DEVELOPMENT OF THE ALKALI INDUSTRY IN THE MERSEY AREA.

(Delivered to the Study Circle on Nov. 4th, 1924.)

By H. THOMAS, M.A.

DURING the Napoleonic Wars, the Salt Duty, which was already heavy, was increased to £30, thus rendering the working of the Leblanc process (for the manufacture of alkali) unremunerative in this country. In 1823, however, the duty was repealed, and James Muspratt lost no time in establishing the process in Liverpool. The early years were full of anxiety for him, but success was assured. As the whole of the area which he had leased at Liverpool had been filled up and, consequently, allowed of no further room for expansion, he moved to St. Helens in 1828, and there erected a works in conjunction with Gamble. He chose a site on the canal side adjacent to a colliery. The land was probably cheap, the drainage suitable, while in the town was a glass industry. St. Helens was then a pretty little country town. The alkali works disturbed its apparent serenity, for the condensation of waste fumes had not then been successfully accomplished. On this account Muspratt had continual trouble with his neighbours. Tired of this, he moved to Widnes in 1850. In the same year Gossage also took up residence there close to the lock leading to the canal that connected Widnes and St. Helens. "The site was well selected; the St. Helens railway ran sidings into it, and it had advantages of communication both by river and canal. . . . The prevailing west winds would carry all the vapours, not inland over farms and residential properties, but away from these over a long stretch of river, so that little or no damage could be done."[1] So successful was the industry that Widnes was transformed from "a pretty, sunny riverside hamlet, with quiet, sleepy ways, into a settlement of thousands of labouring men, mostly Irish, with dingy, unfinished streets of hastily constructed houses, with works that were belching forth volumes of most deleterious gases and clouds of black smoke from chimneys of inadequate height, . . . the air reeked with gases offensive to the sight and smell, and large heaps of stinking refuse began to accumulate."[1] Notwithstanding the long stretch of river over which the vapours were carried by the westerly winds, the winds which caused the principal damage, the plantations, and even the farm lands on the Runcorn side, towards Norton Priory, received very great injury. In response to popular agitation, a Royal Commission was appointed and an Alkali Act was passed in 1863 enforcing the condensation of no less than 95 per cent. of the muriatic acid evolved in the salt-cake furnaces. Gossage had already solved the problem of condensation in 1836.[2]

By the time of the passing of the Alkali Act, alkali works using the Leblanc process had sprung up in several places in South Lancashire. One authority states that there were fifty.[3] So successful was the Leblanc industry in this country that it became the most extensive in the world and outstripped that of all other countries put together.

Why was the industry attracted to South Lancashire? Why did it thrive here?

The determining factors appear to have been the suitability of the area for assembling all the raw materials required, and also its convenience for effectively working up and marketing the various products. There were also minor factors which in the aggregate played a significant part, but space limitations prevent their inclusion here.

When an industry needs several raw materials, that industry becomes localized where the raw materials can be most conveniently and profitably assembled, with due regard, of course, to the effective working up and marketing of the products.

The chief raw materials required for the Leblanc industry were: coal, salt, pyrites and limestone.[4]

When coal is used as fuel by an industry, the tendency is for that industry to cling to suitable coalfields. The alkali makers of the Mersey area had the cheap coal of South

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[1] Allen. "Some Founders of the Chemical Industry" (1906).

[2] Gossage. "On the History of Alkali Manufacture" (Report, British Association Meetings, Manchester, 1861).

[3] Kingsett. "The Alkali Trade," p. 74.

[4] See Thomas, "A Geography of the Chemical Industry of Western Europe" (ready shortly) for a Genealogical Table of the Leblanc Industry.

Lancashire at hand, for its conveyance to the Mersey had been facilitated quite early by the cutting of such canals as the Sankey Canal. In fact, around the Weaver Basin and Lower Mersey there is almost a ring of coalfields.

Salt could be obtained cheaply and in abundance from the Weaver Basin *via* the River Weaver, which had been canalized in the early part of the eighteenth century.

Buxton limestone gravitated naturally to the Mersey, while additional supplies of limestone could be obtained from North Wales.

The introduction of pyrites on a large scale was only gradual. At first, native sulphur from Sicily was used, but the restriction imposed on its export in 1838 caused an enormous rise in price. Fortunately, the difficulties connected with the treatment of pyrites had just been overcome. As the pyrites from Spain was considered to be the richest and cheapest, competition was practically eliminated. Both sulphur and pyrites could be conveniently transported to the consuming area *via* the Mersey. Along the Mersey was also brought Chile sodium nitrate, another bulky raw material. Thus, a point on the Mersey was chosen not merely because it was midway between the coal, salt and limestone areas; the heavy materials brought from abroad exerted a "portward" tendency—a tendency which was later accentuated by the development of coastal and overseas markets. As the Mersey is the natural gateway of the wealthy industrial region around, transport facilities increased rapidly by sea and by land with the progress of the industrial revolution. With this increasing concentration of transport routes, there was growing up a geographical advantage of the first order.

With regard to the convenience of a situation for marketing the products of an industry, mere proximity to a market does not always render the situation of a district trading therewith geographically favourable. The advantages of a situation from the marketing point of view are determined by the facilities for transport and communication. Where these are identical, the advantage naturally belongs to the nearer place of production. While the Mersey is the natural outlet for a wealthy industrial hinterland and has excellent coastal and overseas relationships, it is also a great line of dispersal, the central distributing agency, for that same region. That region, as it advanced industrially, consumed more and more of the products which the alkali industry had to offer. In fact, the very success of the region, industrially, depended upon a ready supply of the necessary heavy chemicals.

South Lancashire has been a heavy consumer of domestic soaps since the commencement of the Industrial Era—really because of the local soft coal used in houses and in works; here, and also in Yorkshire, the developing textile industries were consuming textile soaps in increasing quantities. Here, consequently, there were soap factories catering for both domestic and industrial consumers.[5] It is well to note in this connection that, about the beginning of the nineteenth century, the processes and extent of the manufacture of soap were revolutionized by Chevreul's classical investigations on fats and oils, and by Leblanc's process for the manufacture of caustic soda from common salt. It was partly to produce the new soda for the soap-makers around that Muspratt started his Leblanc works at Liverpool. At first the soap-makers would not buy the new soda, and Muspratt was forced to give away large quantities to overcome the prejudice.

Sulphuric acid, one of the fundamentals of a thriving heavy chemical industry, was required in increasing quantities as Great Britain and the Western world developed industrially. Although sulphuric acid does not lend itself readily to world trade, the products for which it is used do. It is often stated that there is scarcely a manufactured article into the preparation of which this acid does not enter at some time, either directly or indirectly, and, in consequence, it is often described as "the life-blood of an industrial nation in both peace and war." Many Leblanc works now stop with the production of sulphuric acid. The substitution of pyrites for sulphur in the manufacture of sulphuric acid gave rise to the extraction of copper, and also of silver and gold, from the residues, an industry of enormous extent to-day. Arsenic and selenium are recovered from the flues of the pyrites burners, and these elements find application in various industries.

Even for some time after the passing of the Alkali Act of 1863, hydrochloric acid was condensed merely to conform to the law, and was then run to waste in the nearest watercourse. But such a waste was discontinued in later years when it was found that the process of decomposing salt by sulphuric acid worked out profitably only if the hydrochloric acid were fully utilised. In many cases this acid has risen from the rank of by-product to that of the best-paying principal product.

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[5] "Victoria History of the County of Lancaster," vol. ii, pp. 402—403 (1908).

In the early eighteenth century, a period of several months was required to bleach a piece of cloth. Indeed, it was the custom at that time for cloth to be sent from this country to Holland to be bleached. "For instance, our linen manufactures were sent in the spring to Holland, where they were steeped in potash lye, washed, steeped in buttermilk, laid on the grass for several months, and finally returned in the autumn."[6] Such a process was unnecessarily expensive and slow. Later on, the process of exposure was established in this country, but "grassing," as it was called, was extremely difficult in South Lancashire because of atmospheric pollution. Naturally, every device for the shortening or elimination of the process was eagerly sought after. With the adoption of chlorine compounds, the time occupied in bleaching was reduced from several months to a few days. Although the supply of hydrochloric acid became plentiful after the condensation of waste fumes had been rendered possible, the manufacture of bleach remained costly until the introduction of the Weldon process for the recovery of manganese in the generation of chlorine. Deacon's process became a serious competitor, since it eliminated the loss of chlorine as calcium chloride. Now chlorine is obtained directly by electrolysis of brine with its equivalent of caustic soda solution. The bulk of the chlorine so produced is used for the making of bleaching powder, whilst part is used for making hydrochloric acid. There is a growing tendency to use liquid chlorine for various purposes, such as sterilizing water and the treatment of effluent, and also for the production of a range of organic chlorine compounds, *e.g.*, the chlor-benzenes so important in the dye industry.

Another improvement, and one which, like hydrochloric acid, rendered the Leblanc process more able to meet competition and the increasing demands of industry, was the recovery of sulphur from the residue of the lixiviating tanks, generally known as alkali waste. As each ton of soda produced gave rise to the formation of one and three-quarter tons of this waste, the sulphuretted hydrogen from which caused almost as much havoc as the uncondensed muriatic acid of earlier days, the problem of its utilization was, therefore, one in the settling of which the financial success of the Leblanc process came to depend. After repeated attempts, a practical solution (Chance's process) was eventually arrived at, enabling the recovery of pure sulphur for reconversion to sulphuric acid, etc., and also, by a modification of that process, supplies of photographic "hypo." It may be noted here that large quantities of sulphur are consumed in the rubber industry, and, in the form of bisulphites, for treating wood-pulp in the manufacture of paper and artificial silk. Sulphur is also used in the match industry, for bleaching purposes, for the manufacture of black gunpowder, and in the production of ultramarine for laundries.

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[6] Higgins. "The Dyeing Industry," Chap. V (1919).

Thus did improvement follow improvement, each one making the Leblanc industry more complicated, but, nevertheless, more fitted to meet competition and to cater for the increasing demands of industry. Its very complications made it the source of unlimited by-products. It was only by such developments and the economic reorganization, in 1890, by the manufacturers using the Leblanc process, that the Leblanc process was able to survive competition from the younger ammonia-soda process. The reorganization referred to was the combining of the principal Lancashire firms with several other British firms to form the United Alkali Company.[7]

An attempt has been made to show how, under the influence of various factors, the alkali industry became localized in South Lancashire. However, with a change in any of those factors—for instance, in the bulk of raw materials required—there will always be a tendency for the industry to migrate to a more favourable situation, although there will be powerful factors adding to the inertia of the industry. Such a partial migration occurred in 1873, when the ammonia-soda or Solway process was established by Brunner and Mond at Winnington, right on the salt deposits of Cheshire. The sodium costs next to nothing, as the brine is pumped directly from the salt-beds below. The fuel required is considerably less than the amount used in the Leblanc process, while, in addition, there is the total absence of the necessity of employing sulphur

7. "Victoria History of the County of Lancaster," vol. ii, pp. 399—401 (1908).

compounds as an intermediary. Moreover, the ammonia-soda process has been greatly elaborated into a very complicated, perfectly regularly working scheme into which the cost of labour and loss of ammonia are reduced to a minimum. With the development of the process, the selling price of soda constantly dropped, so that the Leblanc process could only hold its own by reason of its valuable by-products, of which the ammonia-soda process yielded none. It was only by the control of the prices of some of the by-products that the Leblanc industry could survive and remain even a modest producer of alkali. The output of alkali by Brunner-Mond, however, increased in a surprising fashion. "Alkali is, of course, essential for the manufacture of soap, glass, enamels, glazes, porcelain, ultramarine, water-glass, paper, baking-powder, etc., and large quantities of it are used in cleansing operations of all kinds. The present extensive production of cyanide is dependent on supplies of alkali, as is also the extraction of chromium, tungsten, and molybdenum for their ores. These products control other industries, such as the extraction of gold by cyanide, and the manufacture of special steels in which the metals chromium, tungsten and molybdenum are employed. The textile and dye industries are also large users of alkali."[8]

The introduction of electrolytic processes, representing the final development so far, gave the Leblanc process another severe blow.[9] Commercial success was utterly impossible, however, until the invention of the dynamo allowed the production of an electric current at a sufficiently cheap rate. It stands to reason that electrolytic processes have been principally developed in those regions where electric current can be produced in the cheapest possible manner, although power is not the only condition to be considered, as, for instance, the question of freight to a centre of consumption may play an important part. As coal is cheap in the Mersey area and other conditions are favourable, electrolytic processes have been established there with success. In this connection might be quoted the name of Castner, Kellner Alkali Co., Ltd., which has its works at Weston Point, Cheshire. Brine for electrolysis is supplied by pipe line from Northwich. How impor-

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8. Guthrie and Doran. " Chemical Manufactures on Merseyside (Handbook, British Association Meetings, Liverpool, 1923).
9. Pring. " Some Electro-Chemical Centres " (1908).

tant to the company is the question of a cheap electrical current may be gathered from the several changes which have been made in the power-plant since the establishment of the works in 1896. Electrolytic processes have also been adopted by the United Alkali Co. at Widnes for the production of caustic soda, chlorine, bleaching powder, and for the preparation of organic intermediates for dyes and explosives, in which chlorine has a part.

# INTER-RACIAL PROBLEMS AND WHITE COLONISATION IN THE TROPICS.

By Professor J. W. GREGORY, D.Sc., F.R.S.

(The Presidential Address delivered to the Geographical Section [E] at the Toronto Meeting of the British Association for the Advancement of Science, 1924.)

## I.—THE MODERN INCREASE IN POPULATION.

THE problem of the present century, according to many observers, is the problem of the colour line. We are warned from one side of the danger to civilisation of the rising tide of colour; and from the other of the peril to humanity from the rising tide of colour prejudice. The difficulties of the racial problems have been intensified by the unprecedented increase in the world's population. According to the estimates in 1696 of Gregory King, a pioneer in political statistics, the utmost population which England could support would be 22 million, and that number would not be reached until the year 3500 or 3600—"in case the world should last so long." In the year 1900, according to his expectations, the population would have amounted to only 7,350,000. These egregious miscalculations are a warning of the uncertainty of statistical forecasts as to population and an illustration of its surprisingly rapid increase in the modern world owing to the application of science to commerce, industry and public health. This accelerated increase is mainly due to the European race, but it has been most rapid in Africa and Asia in consequence of the reduction by European administration of internal war, plague, pestilence and famine. From 1906 to 1910, to quote the latter half of the last normal decade, the population of the world grew at the rate of doubling in sixty years. If this rate were to be maintained the 6,600 millions of people, which it has been calculated is the most that the world can feed, would be in existence in 120 years; and even if the food supply were indefinitely multiplied by the precipitation of the nitrogen of the atmosphere as a constant rain of manna, standing room on the earth, exclusive of the remoter Arctic and Antarctic lands, would be all filled when the population numbered 700 billion (*i.e.*, million million) in the year 3000.

The rapid increase in the population of the world during the last half-century has had disturbing political influences. Thus many parts of India have apparently almost the maximum population possible under existing economic conditions, and the slow present increase is gained painfully to the accompaniment of irrepressible discontent. Countries which once had extensive empty lands have begun to close their ports to aliens, in obedience to the principle that each land must consume its own surplus population. The United States, the "melting-pot" where the mixed races of the Old World were being fused into a new type, has adopted measures based on the growing belief, in the words of Lothrop Stoddard, that "the book of race migrations must be closed for ever." The halt at Ellis Island has already warned eastern and southern Europe that America is no longer an open asylum for refugees. The three great natural outlets from Asia have been closed by the prohibition of immigration thence into western America, by the "White Australia" policy, and by the refusal of eastern and southern Africa to accept further Asiatic contributions to their needed enlarged supply of labour. The struggle for expansion, which was the ultimate motive of the World War of 1914-18, will inevitably be still more bitter and terrible if it become a struggle for existence between the White and Coloured races.

The effort to forsee the future progress of the world raises two contrasting visions. The increase in the wealth and prosperity of all the continents by the influence of the European race may be continued, either by colonisation, as in America and Australia, or by administration, as in Asia and Africa. Asia, by improved industrial methods, and Africa, relieved from the slave trade, may continue to advance in co-operation with the European race instead of under its government; and European control may be voluntarily withdrawn as sympathetic alliance replaces the older systems of servitude. If those developments take place the twentieth century will be indeed a golden age.

The alternative picture is darker. Europe, during the past fifty years, like Portugal in the sixteenth century, may have taken on tasks beyond its power. The drain on the manhood of Portugal by its vast colonial empire reduced the home population by half, the land went out of cultivation, the country was stricken by famine, and Negroes were introduced to till the derelict farms and then absorbed into the nation. The dilution of the Portuguese by Negro blood is often regarded as one of the main causes in the fall of Portugal from its former political, scientific and intellectual pre-eminence. Has Europe been led into the same enterprising but disastrous error? Has it undertaken the administration of larger areas than it has the *personnel* to maintain? Will, for example, the African troops in France have a similarly demoralising effect as the Negroes in Portugal and the slaves carried into Italy during the decline of the Roman Empire?

## II.—THE RACES OF MANKIND.

Consideration of inter-racial problems requires a classification of the races of mankind. The most popular classification is that into four races based on colour—the white or European, the yellow or Mongolian, the brown or non-Mongolian Asiatic, and the "black" or Negro. These colour names, however, are only valid if used in a conventional sense, which is often inaccurate.

The character of the hair forms a more reliable basis and it divides mankind into three primary races—the Caucasian, Mongolian, and Negro. The Caucasian has abundant wavy hair; the Mongolian long, lank, black hair; and the Negro short woolly hair. This classification is only politically suitable if the Caucasians be subdivided into two sub-races, the fair-complexioned people of northern Europe, who were named by Huxley the Xanthochroii, and the dark Caucasians or brown people, the Melanochroii of Huxley, who include the south Europeans, and some still darker people in Asia and Africa.

The numbers of the white, yellow, brown and black divisions of mankind, according to the returns for the last available year before the war, were—white or European race, 520 million; Mongolian, 620 million; brown, 370 million; Negro, 190 million—total, 1,700 million. The coloured races are in the majority of more than two to one. The advantage conferred on the Whites by their more efficient organisation, better equipment, and command of transport and machinery should enable them to hold their own in any direct conflict, in spite of their inferior numbers. The danger to the white race comes from their dependence on trade with Asia and Africa which would be jeopardised by the restoration of the political conditions that held before those continents fell under European influence. The maintenance of European dominion lays a heavy burden on the white race, as it is responsible for the government of eight-ninths of the habitable land of the globe. One-third of the inhabitants of the world rule eight-ninths of it; the remaining two-thirds of the people control only one-ninth of the land.

This condition is modern. A thousand years ago the Whites held only part of Europe, for Spain was then ruled by the Moors and south-eastern Europe by Asiatics. Four centuries ago the white race had secured nearly all Europe; but the coloured races still ruled the rest of the world. The formula of Asia for the Asiatics and Africa for the Africans was then accepted, as well as America for the Red Indians. Even at the beginning of the last century only the coastal belts of North America and a few small settlements in Africa and Asia were occupied by the Whites. During the last century, and especially since the development of railway and steam navigation after 1840, the whole of America, all Africa except Abyssinia and Liberia, all Australia, and all Asia, with the exception of China, Japan, and Siam, have fallen under the control of European people. Since 1900 European influence, has, however, suffered extensive reductions in Asia and Africa, which have advertised the relative decrease in the number of white people. During the past half-century the unprecedented increase in the white race has been exceeded by that of the coloured people. Increased disparity in numbers means, in a democratic age, an inevitable transfer of power; while the former prestige of the white man has been undermined by his own beneficent rule. Alike in war and peace, the personal authority which the white man held in 1900 has undergone a momentous decline.

## III.—Geographical Principles.

Whether that movement is a temporary set-back or a permanent change in inter-racial relations is a problem on which Geography should afford the most reliable available guidance. If we accept the scope of Geography as the study of the earth with especial relation to man, its primary duty is to collate the results of other sciences which throw light on the major problems of human development. It should learn from physiology the effects of climate, altitude, and tropical sunshine on different races of mankind; from biology what diseases are due to parasites and how infection may be prevented; it should find from agriculture the most profitable local crops and how to improve the food supply; it should discover from geology the nature and distribution of soils and the available supplies of minerals and mineral fuels; and it should seek from the ethnologist guidance as to the characteristics of the races who are competing in the struggle for existence. The geographer provided with this knowledge should endeavour to weigh evenly, free from race prejudice and political bias, and undisturbed by the fears of vested interests, the factors which control the disribution of mankind.

The ruling geographical principles as to the distribution of the three primary races may be summarised as follows: 1. The population must be scanty in the colder regions of the world owing to their long, severe winter, and also in the dry deserts, except in those relatively small areas that can be watered by irrigation. 2. The tropical regions have hitherto been the home of the coloured races, while the white nations have been mainly restricted to the temperate zone. 3. When different races live side by side, the more primitive race, unless conditions be imposed on it fatal to its spirit, will outlive the other wherever the struggle for existence is keen.

From these principles two main inferences can be drawn. First, the frigid zones, the chief deserts, and the tropical plateaus above 12,000 ft. or so above sea level will always have a sparse population, and will long be left except for occasional commercial, mining, and industrial centres, to the most primitive tribes who have access to them, such as the Eskimo in North America, the Lapps in Europe, and various hardy, easily contented Mongols in Central Asia. Second, white colonists have no chance of permanently occupying land near the overcrowded parts of Asia or accessible to the fast multiplying Negroes of Africa. White merchants may find in these regions profitable trading centres, and may for a time rule and administer them; but when white enterprise has subdued the land, built railways and utilised the rivers, the coloured man will oust the white from all but the few posts that require experts.

### IV.—INTER-RACIAL RELATIONS.

The relations of the white and coloured races living in the same land may be settled on any one of four lines—amalgamation by miscegenation; co-residence without fusion, and with complete social separation; the disfranchisement of the coloured population as State wards; or the segregation of the different races in separate countries or communities.

1. (*a*) *Racial Fusion.*—Amalgamation by complete racial fusion is often recommended as being either inevitable or desirable, or both. That plan is recommended by the improvements in stock and plants wrought by judicious interbreeding, and mankind may be expected to benefit by the same process. The great modern nations are of mixed origin, and their efficiency is doubtless due to the varied capacities inherited from their miscellaneous ancestors. Accordingly many authorities, such as Lord Olivier, anticipate the settlement of serious difficulties and the betterment of the human race by inter-racial fusion. Lord Olivier claims that mixed races are superior to those of simpler constitutions. "So far, then," he says, "as there survives in a mixed race the racial body of each of its parents, so far it is a superior human being, or rather, would I say, potentially a more competent vehicle of humanity" ("White Capital and Coloured Labour," 1906, p. 22). H. G. Wells regards inter-racial prejudices as one of the worst of existing influences. "I am convinced myself that there is no more evil thing in this present world than Race Prejudice; none at all, I write deliberately—it is the worst single thing in life now. It justifies and holds together more baseness, cruelty and abomination than any other sort of error in the world." Its strength he considers renders it impossible for two races to live separately and in amity side by side. "Racial differences," he declared in an earlier statement, "seem to me always to exasperate intercourse unless people have been elaborately trained to ignore them. Uneducated men are as bad as cattle in persecuting all that is different among themselves. The most miserable and disorderly countries of the world are the countries where two races, two inadequate cultures, keep a jarring, continuous separation" ("The Future in America," 1906, p. 273).

The benefits of interbreeding, according to many authorities, are limited to parentage nearly akin, though in such cases the advantages are well marked, as exemplified in Canada.

Intermarriage in mankind, it is urged, should be restricted to nearly related people. Herbert Spencer, in a famous letter that was not published until after his death, declared that the interbreeding of widely different types produces weak, inferior offspring, with "a chaotic constitution." This view has been supported by modern students of Eugenics. Major Leonard Darwin, in a letter to the members of the recent Imperial Conference (1923), urged that "theoretical reasons can be adduced for believing that interbreeding between widely divergent races may result in the production of types inferior to both parent stocks; and that this would be the result of miscegenation is at all events a common belief." Dr. J. A. Mjoen—who, according to Major Darwin, has made a long study of these questions and is "an authority well worth considering"—after detailed study of the Mongolian-Caucasian hybrids in Norway, reports that the children of these Lapp-Norwegian unions are inferior physically and mentally. He concludes from his investigations that "crossings between widely different races can lower the physical and mental level." He urges "Until we have more definite knowledge in the effects of race-crossings it will certainly be best to avoid crossings between widely different races" ("Eugenics Review," 1922, vol. xiv., p. 39).

Professor Lundborg, of the Upsala Institution for the Study of Race Biology, has adopted the same conclusion. He deplores "hasty race-mixture between nations who, from a race-biological point of view, stand too far apart." He declares that "a mixture between nations who, from a race-biological point of view, stand high and others containing lower race-elements, such as gipsies, Galicians, certain Russian tribes, etc., is certainly to be condemned." Lord Bryce has twice asserted the same conclusion. According to this view mongrels (the offspring of different varieties) should be better than at least one of the parents, while hybrids (the offspring of different species or primary divisions of mankind) are necessarily inferior to both parents.

This doctrine cannot be regarded as established, but the strong intellectual aversion to such unions among the Teutonic people will doubtless prevent the adoption of race amalgamation between the Negro and the Whites in North America or of northern Europe. Opinion against this policy is hardening in the one country, the United States, where it might be expected to find most support. There, intermarriage between Whites and Negroes is illegal in most of the States, and opinion is against it on both sides, except in so far as it is welcomed by one section of Negroes who would tolerate it to overthrow the social restrictions imposed upon them.

1 (*b*) *Racial Fusion in South America.*—The system of Race Fusion has been followed in tropical South America, which is occupied mainly by a hybrid people. The intermarriage of Spaniards and Portuguese with Indians and Negroes has proceeded to such an extent that only a small uncertain proportion of the inhabitants are of pure European descent. The population of tropical South America is a mixed race with the exception of small clans in some of the cities of Ecuador and northern Peru. In most of South America there is said to be no more prejudice against the mixture of races in marriage than there is in Europe against that between different social classes. The limitation of marriage in South America is by class, not by colour.

"Everything" in South America, said Bryce ("South America," 1912, p. 565), "points to a continuance of the process of race mixture." "Miscegenation," says Garcia Calderon ("Latin America," 1913, p. 356), "is universal in South America between Iberian, Indian and African." "A single half-caste race," he says (*ibid*, p. 338), "with here the Negro and there the Indian predominant over the conquering Spaniard, obtains from the Atlantic to the Pacific" and from Mexico to Patagonia. The predominance of the white race may be maintained in the southern parts, but most of South America seems destined to be the home of a hybrid Indo-Negro-Iberian race. South America illustrates the results of miscegenation on a continental scale.

2 (*a*) *Co-resident Distinctness.*—The second available inter-racial development is by co-residence with the maintenance of racial distinctness. The greatest experiment with this policy is in progress in the United States. It is recommended there by leaders of both White and Negro opinion as the only solution of the inter-racial difficulties. Its most effective champion was the late Booker Washington, who is generally regarded as the greatest Negro whom America has yet produced. This policy aims at the association of the two races in work, but their complete social separation. According to Booker Washington's famous analogy the two races should

be separated in life as completely as the fingers, but as fully united in work as the hand. This idea attracted support from various sides, as it offered a practical basis for development, and involved the renunciation by the Negro, at least for a time, of his claims for political and civil equality. This policy is dependent on the better education of the Negro. Booker Washington, amongst his other titles to fame, was a pioneer in agricultural education; and the success of his institution at Tuskegee has undoubtedly done much to raise the American Negroes. He has, however, been violently condemned by many of his compatriots, owing to his asserted surrender of their claims. According to these critics the advance of this policy has been attended by the lowering of the civil and political status of the Negro, and the intensification of inter-racial feelings by raising the jealousy of the southern Whites at his improved educational and financial position.

The possibility of long-continued associated distinctness by two intermingled races is contradicted, according to some authorities, by historic experience. Lord Bryce states that "whoever examines the records of the past will find that the continued juxtaposition of two races has always been followed either by the disappearance of the weaker or by the intermixture of the two" ("The American Commonwealth," 1911, vol. ii., p. 532). Professor Kelly Miller, of the Howard University, Washington, expresses his conviction "that two races cannot live indefinitely side by side, under the same general régime, without ultimately fusing." A. B. Hart, Professor of History at Harvard University, is more hopeful, and he cites the long-continued co-existence of Hindu and Muslim in India, of Boers and Kaffirs in South Africa, and of English and Indians in North America; but these cases give no more encouragement to the prospects of Negro-Caucasian association in America than do those of the Jews and Parsees.

2 (*b*) *The Position in the United States.*—Whether this policy is possible or not the testimony is overwhelming that the attempt to adopt it in the States has been attended by increasing tension and race bitterness, despite all the influences in its favour.

Under the auspices of a Commission for Inter-racial Co-operation 800 county inter-racial committees have been established. The two races have been uniting more often in educational and social work, both by informal association of neighbours, and by such organisations as the University Race Commission, the Southern Sociological Congress, the Rosenwald and Jeanes Foundations for the building of Negro Schools, the Phelps-Stokes Fund, the General Education Board and its Rockefeller Endowment, and by the munificent gifts of northern benefactors to Hampton and Tuskegee. Moreover, the State Courts, by their decisions as to Pullman cars, have lessened the rigour of the regulations which separated white from coloured passengers on the railways; and the Supreme Court of the United States, once regarded as unsympathetic to the Negro, has dismissed as unconstitutional some of the State laws that have been used to disfranchise him. Many circumstances favour the growth of more friendly feelings between the two races.

Nevertheless, the general testimony of writers on the United States during the past twenty years is that the position has been, and is, going steadily from bad to worse. "The two races," says Professor Hart (1910), "are drifting away from each other and race relations are not improving." A. H. Stone remarked in 1908 the increasing growth of race feeling among the Negroes. Lord Olivier in 1906 predicted that the policy which was and has been followed "will doubtless in time bring about civil war." William Archer, comparing the conditions in 1910 with those at the Atlanta Conference when Booker Washington put forward his co-residence policy, declares "that the feeling between the races is worse." W. P. Livingstone, a writer with West Indian experience, wrote in 1911 ("The Race Conflict," pp. 13, 31) that the negro question "remains, what it has been for a century, the darkest and most menacing cloud on the horizon of national life." and that "the situation is described as being worse to-day than at any time since 1865."

"Any competent observer," said Maurice Evans in 1915, "must see in the South, as in South Africa, a gathering storm, which means ultimately not only industrial war, but industrial war *plus racial* conflict."

The World War for a time appeared to improve the Negro position, owing to the labour shortage in the United States due to the stoppage of immigration from Europe and the urgent demand of the belligerents for munitions. But after peace the irritation of the Negroes at what they regarded as the systematic belittling of their war services and the friction due to increased contact in the cities led to serious race fights during 1919 at Washington, Chicago, Elaine, St. Louis, and Knoxville. These riots, with the determined defence offered by the Negroes, justify the insight of Livingstone's warning—"So gigantic does the problem appear, so difficult of peaceful solution, that the nation is helpless in face of it. It has become so subtly connected and interwoven with all the organic texture of the national existence that the people, as a whole, are afraid to make it a living question, not knowing what might be the result. There is an uneasy consciousness of the truth of the Southern warning, that the forces of the revolution, unspent and terrible, are ready at any moment to break out under sufficient provocation."

3 (*a*) *Racial Segregation in the United States.*—So alarming does the position appear that three drastic solutions have been proposed based on the separation of the Negro community by political disfranchisement, exile, or segregation.

The first is the complete disfranchisement of the whole coloured population, including all with any appreciable proportion of Negro blood, and its tutelage under a special Board of guardians. The negroes would have separate police and law courts, and separate schools in which the training would be mainly industrial. They would be wards of the State, and would elect representatives to their Board of protectors, but would have no votes for the Federal or State Parliaments. A plan for treating permanently a seventh of the population as irresponsible helots would appear utterly inconsistent with the American Constitution, and impossible in modern conditions under any democratic constitution; and the Negroes, and especially the "Near Whites" who are predominantly white by blood, would regard the status proposed for them as an intolerable degradation.

A second and still more drastic suggestion is the compulsory emigration of the whole Negro population to some such places as Hayti and Liberia. This solution was advocated by the distinguished American palæontologist, E. D. Cope, and it was favoured by Abraham Lincoln until he was persuaded that the whole of the North Atlantic shipping could not remove a sufficient number to keep up with the normal increase in the Negro population. The scheme has been often rejected as impossible on the grounds that the American Negroes are too numerous for transhipment, and that there is now no available room for them either in the West Indies or Africa. These difficulties would not be insuperable if the United States were determined to overcome them, and the Negroes were willing to go; for any such migration would obviously have to be spread through a considerable period and neither the cost nor lack of room for the emigrants would be beyond the power of so wealthy and resourceful a nation. But the project is not worth discussion here, as the political difficulties place it out of court.

An alternative segregation policy is that of collecting all the Negroes into one territory or State within the United States. That scheme might have been practicable in 1865 at the close of the Civil War; but as the areas suitable for Negro settlement which were then available have been occupied, this proposal appears as much a counsel of despair as that of transplantation to Africa and Hayti.

The only scheme of segregation within the sphere of practical politics is that for the assembly of the bulk of the Negroes in numerous scattered agricultural settlements where they would be withdrawn from close daily contact with the Whites, but would co-operate with the rest of their fellow-citizens in productive work. This agricultural ghetto policy would probably lessen inter-racial friction; but it would leave the Whites and Blacks in contact on so many surfaces that it might still lead to a slow process of fusion, and would not secure the permanent separation of the two races. The champion of this policy, Maurice Evans, indeed admits that it offers no final solution of the race problem in the United States. "There is," he says, "no final solution possible, and the Negro will remain a problem for generations to come."

3 (*b*) *The Probable Developments in the United States.*—If, therefore, of the three constructive policies absorption is rejected as it would make the United States a nation of octoroons, permanent distinct co-citizenship be impossible, and segregation be impracticable, what development is possible? No single measure that could be imposed on the country by the Legislature appears to be available, but some solution may be reached by a process of drift. It is for the geographer to search for the factors that are likely to guide this drift.

One most significant movement in the southern States is for much of the agricultural work to pass into the hands of immigrants from southern Europe, while the Negroes, through that restlessness which is the weakest element in their character, tend to settle in the towns. Stone, a representative southerner, remarks that planters must seek more reliable labour than that of the Negro, who has already been replaced in tobacco cultivation in Kentucky. Booker Washington repeatedly called attention to the seriousness of the danger that the Negro would be driven from the skilled occupations. The recent agreement between Italy and Mexico for the settlement of 500,000 Italians in Mexico would provide an additional source for Italian inflow into the southern States. The feeling against inter-racial marriage is not so strong among the people of southern Europe as it is with the Teutons; hence extensive south-European immigration into the cotton districts may lead to their future occupation by a hybrid race similar to that of tropical South America. This process would render impossible the continued refusal of political and municipal rights to any citizen who has a trace of Negro blood. The coloured people would regain the suffrage, and the political development of the southern States on normal American lines would be impossible. If the Whites in the southern States be divided between Republicans and Democrats, the Negro vote would hold the balance of power; and owing to the considerable over-representation of the southern States in proportion to population, American politics might be determined by the Negro vote. Such a situation would be intolerable to the northern and western States. Hence, to avoid it, they might agree to the south-eastern States being formed into a group with a special measure of home rule in some departments of Federal jurisdiction.

This solution may take a century or more to develop; but the geographical considerations indicate it as the most probable issue from the Negro strength in the south-eastern States.

3 (*c*) *Segregation in South Africa.*—The system of inter-racial development by the segregation of the different elements in the population, though apparently impracticable in America, is one of the main issues in current South African politics.[1]

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[1] The general election in South Africa, June 1924, shows the growing strength of the movement in favour of segregation.

In Africa, the racial problem, as far as concerns the white and coloured races, is simple in most parts of the continent owing to the overwhelming majority of the coloured population. In Algeria and Tunis there has been an extensive settlement of south-Europeans, with whom the native Berbers are racially allied. Most of Africa is the home of Negroes, whose numbers are increasing faster than any other population in the world. European officials superintend most of the continent, but they and the European traders are few in number and are usually temporary sojourners. In a few localities, such as the Highlands of Kenya and of Nyasaland, the European colonies may be permanent; but even in these localities the bulk of the labour is supplied by Negroes, and much of the retail trade is conducted by Asiatics. The European colonists are a small dominant caste.

It is only in the Union of South Africa that the Whites are in sufficient numbers to form a considerable proportion in the population; but their future position, even in South Africa, is uncertain. There is no doubt of the suitability of the South African climate for Europeans. It has been the home of a large colony for more than a century, and the white Afrikander population is robust and efficient. But the maintenance of the white supremacy and even of a white Afrikander people is doubtful.

The population of the Union of South Africa in 1922 included 1,550,578 Whites and 5,504,580 coloured people; so the latter exceed the white by 3½ to 1 and are increasing the faster. The coloured race is in especial excess in Natal, where Indian coolies supply the bulk of the labour in agriculture, industry, and retail trade. In the rest of the Union the coloured excess is that of the Negro. The white dominion may be maintained either by a small oligarchy managing black labour; or by white workers remaining in sufficient number to keep control under a Parliamentary government.

The oligarchic plan, which is the ideal of the Capitalists, hopes for the development of South Africa on the lines adopted in India until recent years. This system seems, however, to have little more chance of permanence in South Africa than in India. The measures introduced to strengthen it led Booker Washington to condemn the native policy of parts of the British Empire as worse than that of the United States. The rule of South Africa by a minority of white men is threatened by the uprise of an active Negro party which, with the support of the Ethiopian Church, demands its full share in the government of the country. This aggressive South African party, largely inspired from the United States, is likely to increase in numbers and influence. It may be controlled so long as there remains in the country a large number of comfortably circumstanced white labourers. The fundamental difficulty in South Africa is, however, the position of the "poor Whites"; they form a class who are apt to interbreed with the Negroes and increase the percentage of half-castes. Many of the poorer white men have been forced to take work which is despised by the better class of black labourers; and the spectre in South Africa is the steady replacement of white workers by Negroes and half-castes in the skilled occupations. The difference in South Africa between visits in 1893 and 1905 which impressed me as most significant was that all the farriery, which in the former year had been done by Whites, had passed on to the Blacks. This process has gone so far that it threatens the existence of white labour in South Africa, and the Capitalist attitude to it has led to the alliance of the Nationalists and Labour Parties. One of the main issues in contemporary South African politics is the segregation of the Negroes and Asiatics. The Nationalists accept the conclusion that the the white man cannot compete on equal terms with the natives and Asiatics in manual labour. The wages for white labour varies from 10s. to 30s. a day; while that of a native adult varies from 6s. to 30s. a month. The pay of native domestic servants is the same, with the addition of food. The white man in South Africa cannot live on the same wages as the blacks. As the Negro becomes better educated and enters trade after trade, his white competitor must withdraw or reduce his standard of living to a level which involves ultimate demoralisation. Some of the supporters of the Capitalist party admit these facts and consider the fusion of the black and white races at the Cape inevitable.

The Nationalists reject this pessimistic conclusion. They recognise that it can only be avoided by maintaining the distinction between the two races, which are most liable to commingling among the poorer classes. The Nationalist programme, therefore, includes the policy of segregation, which is opposed by the Capitalists, on the ground that it is an anti-Capitalist measure and would raise the cost of labour. General Hertzog and his party, however, insist that some policy of segregation affords the only chance of maintaining the position of the white man in South Africa. The segregation policy in defence of the Whites seems fully justified by its long adoption in the interest of the natives. Thus Basutoland and the Transkei Territory in the east of Cape Colony are reserved for the natives; no European can settle in them without the express permission of the Governor-General. As white labour is excluded from some parts of South Africa in the interest of the Negro, it would seem only fair that the Whites should have a corresponding advantage elsewhere, and especially in districts which were practically unoccupied until the Europeans entered them. According to one plan of segregation the natives should have a privileged position throughout the eastern lowlands of Cape Colony and Natal, and in some eastern districts in the Orange Free State and the Transvaal; some parts of this division of the country should be reserved for the coloured races, and no white people allowed to acquire land or an interest in land within them. In compensation for this restriction certain occupations and some areas should be reserved for the Whites in the western parts of Cape Colony, of the Orange River Colony, and of the Transvaal. The principle of segregation was approved by the Native Land Act of 1913, but it has obvious difficulties. The British residents in South Africa deplore much in the Afrikander Nationalist programme; but its policy of segregation appears to advance the only plan by which South Africa can be developed as the permanent home of a large population of the European race.

## V.—TROPICAL COLONISATION AND THE FUTURE OF AUSTRALIA.

We have seen, therefore, that in North America the presence of the Negro has introduced problems of inscrutable perplexity; that in South America a mixed race is in firm possession; that in Africa as a whole the white man has no chance as a colonist; and that in South Africa his future depends on some complex measure of segregation. In Asia only in the north and north-west has the white man any prospect of permanent dominion. In contrast to these restrictions in Australia the fundamental problem is the possibility of the occupation of the whole continent by the European race.

When the chief inrush of immigrants into Australia occurred after 1850, the belief was almost universal that the natural home of the white man was in the temperate zones, and that the torrid zone must be left to the coloured races. That policy was accordingly adopted by Australia and pursued for 50 years. The tropical districts were left open, with varying limitations, to Asiatic immigration. Few Asiatics, however, took advantage of this opportunity, though large numbers were eager to enter the cities and settlements in the south, where the European had done the pioneer work. In the north the Asiatics were a hindrance, as they were too few to help materially, and they were sufficient to discourage the entrance of white artisans.

In 1901 Australia, on Federation, found itself faced by two problems—the empty north which the open-to-Asia policy had not filled, and the disturbing effect of indentured coolies on white labour. The policy of excluding coloured people and working the northern plantations with white labour was declared to be a physical and physiological impossibility. According to Mr. Benjamin Kidd ("Control of the Tropics," 1898, p. 48), "the attempt to acclimatise the white man in the Tropics must be recognised to be a blunder of the first magnitude. All experiments based upon the idea are mere idle and empty enterprises foredoomed to failure." Lord Olivier's opinion is that "Tropical countries are not suited for settlement by Whites. Europeans cannot labour and bring up families there." Mr. R. W. Hornabrook declares that to send Whites from Europe to Tropical Australia "is nothing short of a crime—it is worse, it will be murder."

In 1907, in opposition to this traditional view, I remarked ("Australasia," I., p. 15) that "medical authorities on tropical climates seem now, however, to be coming to the opinion that this view is a popular prejudice which does not rest on an adequate foundation." The evidence to that effect had been stated in a remarkable paper by Dr. L. W. Sambon, and endorsed by the late Sir Patrick Manson, and had been supported by the general trend of medical opinion during the past seventeen years. Thus a leading article in the "Journal of Tropical Medicine" (15th January, 1919, pp. 15-16) proclaims "Disease, not climate, the Enemy . . . If there is one thing which the study of tropical diseases has shown us, it is that disease, and not the climate, is the cause of this crippling of trade, of the necessity for frequent changes 'home,' involving expense and the employment of a large permanent staff to fill the gaps caused by sickness, and therefore lessening of profits. The legends, a 'bad climate,' an 'unhealthy climate,' are well-nigh expunged from tropical literature. All medical men familiar with the Tropics are cognisant of the fact that disease and, what is more, preventable disease, is the cause of the bad name associated with any particular region of the Tropics."

The general distribution of mankind is in such close agreement with the rule that the white race has settled in the temperate regions and left the tropics to the coloured races, that any policy inconsistent with that arrangement must be prepared to encounter a strong prepossession to the contrary. Nevertheless, that rule is inconsistent with so many facts that it is not a safe basis for a national policy. In America, for example, the whole continent, except for the Eskimo in the north, was occupied by dark-coloured Mongolian tribes, in which, according to Flower and Lydekker ("Mammals," 1891, p. 752), "the colour of the skin, notwithstanding the enormous difference of the climate under which many members of the group exist, varies but little." The most northerly part of Europe is occupied by a coloured race, the Lapps. In Africa the darkness of the skin does not always vary in accordance with distance from the Equator.

## 1.—Supposed Unfavourable Factors in Tropical Climate.

(*A*) *Heat.*—The belief in the unsuitability of the Tropics for the white man rests on several considerations. Most importance is naturally attributed to the heat, as that is the essential difference between the tropical and other zones. Intense heat is regarded as injurious to people not protected by a dark skin. That view overlooks the automatic process by which the living body adjusts itself to temperatures even higher than occur in any climate on earth, and that would quickly cook it, if dead. During some experiments by Sir Charles Blagden in 1774, Sir Joseph Banks remained in a room for seven minutes at a temperature of 211°; and Blagden subsequently stayed at the temperature of 260°, while eggs were roasted hard and beefsteaks cooked in a few minutes. White men work in furnaces and bakeries at 600°F., and if they can survive such temperatures even for short spells, they should be able to withstand the hottest climate on earth.

That heat is not the dangerous factor in the Tropics is obvious from the well-known fact that the hottest areas are often the healthiest. Agra is hotter and healthier than Bombay, and the summer heat of Colorado is fiercer than that in the less healthy Mississippi Valley.

(*b*) *Moist Heat.*—As dry heat affords no explanation of the high mortality of some tropical localities, appeal was made to moist heat, and to the combination of heat and moisture marked by a high wet-bulb temperature. At any temperature above blood heat the body is cooled only by the evaporation of perspiration, which does not take place in air saturated with moisture. Hence in the Townsville experiments ("Proc. R. Soc.," B.xci., 1920, p. 121), a man placed in a room in which the wet-bulb temperature rose from 98° to 102°, fainted in forty minutes. In a hot locality a dose of atropin, which suppresses perspiration, may be quickly fatal.

A wet-bulb temperature higher than blood heat would be fatal to men, white or black; but no earthly climate has such temperatures. It was at first suggested that the limit of human activity was the wet-bulb temperature of 73°. I have previously quoted[2] well-authenticated records of miners working for four-hour spells for months at the wet-bulb temperature of 80° to 90° in Hong-kong, the Straits Settlements, Beufort in Borneo, and Ocean Island in the Pacific. At all these places people, both white and coloured, survive these conditions. Hence the limit has been gradually raised, and it is recognised that men can withstand wet-bulb temperatures of 85°, though the power of work under such conditions is necessarily greatly reduced. The highest wet-bulb temperature mentioned in Dr. Griffith Taylor's record at Port Darwin is 81°. The wet-bulb data for North Australia are scanty; but there seems no reason to expect that any considerable areas have a more uncomfortable climate than Calcutta, to which Dr. Taylor compares the worst localities of tropical Australia. Calcutta is one of the healthiest cities in India, and has a large and vigorous European population, many of whom spend there the whole year.

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[2] The Wet Bulb Thermometer and Tropical Colonization." *Journ. Scot. Meteor. Soc.*, ser. 3, vol. xvi, 1912, pp. 3—9.

Moist heat is trying and must be considered in judging climates from the standard of comfort and personal efficiency. The investigation of wet-bulb temperatures—the significance of which was shown by Sir John Haldane, has been developed in reference to the textile industries by Dr. Leonard Hill and Dr. Boycott, to mining by Sir John Cadman, and to the conditions of tropical Australia by the work of Professor Osborne, and has been illustrated by the ingenious climographs of Dr. G. Taylor—has yielded results of high practical value. But the wet-bulb isotherm does not delimit the areas where the white man may live and work, and does not really affect the question of white *versus* black colonisation, as there does not seem to be any reason to believe that black men could withstand a higher wet-bulb temperature than white men. In answer to an inquiry on this question, Sir John Haldane replied that his impression, on the contrary, was that "white men can usually stand more heat than black men," and he reported the information given him that in places like the Red Sea the Clyde stokers stand the heat better than the Lascars, "and, in fact, have constantly to carry the latter out and lay them on deck to cool." Dr. C. J. Martin also informs me that there seems no physiological reason why the conditions indicated by a high wet-bulb temperature should be more adverse to the white man than to the coloured races.

(*c*) *Monotony in Temperature.*—Another temperature factor that has been appealed to is that depressing equability of temperature which occurs on some tropical coasts. Excessive monotony in the weather is no doubt depressing and temperature changes have a stimulating beneficial effect. Extremes of cold and heat are still more inconvenient and trying, and a moderate equability is often advertised as an attractive feature in a climate. The equability of the oceanic climate is recognised as most favourable for many conditions of health. The areas over which extreme uniformity of temperature prevails throughout the year are, however, so restricted that this factor does not affect the problem of tropical settlement as a whole. With the exception of low tropical islands, places with monotonously equable climates are in positions whence a change may be secured by a visit to some neighbouring hill country.

(*d*) *Actinic Rays.*—A fourth factor to which much importance has been attached in connection with the tropical climate is the effect of the chemical rays of the sun. Great importance was once attached to the pernicious influence of the ultra-violet chemical rays of the sun on persons not protected by a dark skin. Residents in the tropics were, therefore, advised to line their clothes with orange-coloured fabrics to shield themselves from the chemically active rays. These views reached their extreme in the writings of Surgeon-Major C. E. Woodruff in 1905 on the "Effects of Tropical Light on White Men." Woodruff held that the actinic rays of the sun are so inimical to the white man that they inhibit his permanent settlement within 45° of the Equator. He therefore regarded the tip of Patagonia as the only area in the Southern Hemisphere fit for white occupation. The temporary stagnancy of the population of Australia after the droughts of 1900-1902 he regarded as evidence that the native-born white Australian and delicate New Zealander were wasting away through physical decay due to the enfeebling sunshine, just as the health of American and European children was being ruined by the "daft" practice, as he called it, of flooding schoolrooms and nurseries with streams of light. Woodruff's conclusions have naturally been disregarded.

Any deleterious effects of the chemical rays of the sun may be avoided by the use of appropriate clothes, and physical considerations suggest that a black skin should afford less protection than a white skin. Any injury that may be wrought by powerful sunshine, according to Aron's work in the Philippines is due to the heat rays at the red end of the spectrum and not to the chemical rays. The modern lauded system of heliotherapy is based on the belief that strong sunshine is a powerful curative agency.

(*e*) *Miscellaneous Factors.*—The four previously considered factors have the advantage that they can be readily understood and tested; but as they have failed to provide any basis for the unsuitability of the tropics for the white man, the appeal has been shifted to a complex of tropical influences, including a rise of body temperature, the lessened activity of lung and kidney, and nervous disturbances. Dirt and disease and carelessly prepared food are also mentioned, though they are due to human agencies. The physiological effects of the tropical climate in this indictment are contradicted by high authorities.

The rise in body temperature is emphatically denied amongst others by Breinl and Young from observations in Queensland, and by Chamberlain on the basis of extensive observations on American soldiers in the Philippines. A slight rise may occur in passing from the temperate regions to the tropics, but it is soon recovered; and Shaklee reports from his experiments on monkeys at Manila that "the healthy white men may be readily acclimatised to the conditions named—that is, to the tropical climate at its worst." Shaklee adds that the most important factor in acclimatisation is diet.

The asserted ill-effects of the tropics on respiration appear to have no more solid basis. Professor Osborne found at Melbourne that the rate of respiration was increased on the hottest days, and his observations agree with those of Chamberlain in Manila. So far from the tropical conditions being injurious to the kidneys, it is asserted, as by Dr. A. B. Balfour, that there is less trouble with that organ in tropical than in temperate climates. The apparently inconsistent observations on the action of the kidneys between various tropical localities and people, may be explained by differences in diet.

The remaining charges against the tropical climate are insignificant, or not based on climatic elements, or are indefinite. Some of the alleged factors are trivial, such as the liability to various skin diseases owing to a change in the skin reaction; for if the white man allows himself to be kept out of any country by such a cause he does not deserve to get in. The hygienic troubles due to association with an insanitary people are sometimes adduced; but they are not an element in climate and would not operate in a land reserved for white people. The remaining factors rest on ill-defined nervous ailments which are more likely to be due to domestic difficulties than to climate. These nervous troubles fall mainly on the women who have the strain of disciplining the native servants into conformity with British ways. Nervous disorders are said to be worst in hot, dry, dusty regions which in the tropics are generally regarded as the most healthy, except to those whose constitutions require a moist atmosphere.

### 2.—MEDICAL OPINION.

Medical opinion has gone far towards the general adoption of the conclusion that there is nothing in climate to prohibit the white man from settling in the tropics.

As an example of a recent authoritative verdict may be quoted the report of a sub-committee appointed in 1914 by the Australian Medical Congress to investigate the medical aspects of tropical settlement. After extensive inquiries, the comparison of the blood of children born and bred in the tropics with those of the temperate regions, and other evidence, the sub-committee reported in 1920 as follows: "After mature consideration of these and other sources of information embodying the results of long and varied professional experience and observation in the Australian Tropics, the sub-committee is unable to find anything pointing to the existence of inherent or insuperable obstacles in the way of the permanent occupation of Tropical Australia by a healthy indigenous white race. They consider that the whole question of successful development and settlement of Tropical Australia by white races is fundamentally a question of applied public health in the modern sense. . . . They consider that the absence of semi-civilised coloured peoples in Northern Australia simplifies the problem very greatly."

### 3.—Improvements by Public Sanitation.

The trend of medical opinion to the view that there is no physiological reason why the white race should not inhabit the tropics may lead to a change similar to that regarding some localities in the temperate zones, which were formerly regarded as death-traps and are now popular health resorts. The island of Walcheren, on the coast of one of the most densely peopled countries in Europe and only thirty miles from so fashionable a watering-place as Ostend, had a century and a quarter ago one of the most deadly climates in Europe. The largest army which had ever left the British islands landed there in 1809. Napoleon did not think it worth powder and shot. "Only keep them in check," was his order, "and the bad air and fevers peculiar to the country will soon destroy the army." Napoleon's judgment was justified. The force of 70,000 men disembarked on July 31 and August 1. By October 10, according to Sir Ranald Martin, 142 per thousand were dead of disease, and 587 per thousand were ill.

Algeria is now a trusted sanatorium. Yet disease annually swept away 7 per cent. of the French army that conquered it. Sir A. M. Tulloch remarked that if the French Government had realised the significance of that mortality "it would never have entered on the wild speculation of cultivating the soil of Africa by Europeans, nor have wasted a hundred millions sterling with no other result than the loss of 100,000 men, who have fallen victims to the climate of that country." The same change of view has taken place in reference to some tropical localities. The deadliness of the Spanish Main to our armies was described by Samuel Johnson. "The attack on Cartagena," he said, "is yet remembered, where the Spaniards from the ramparts saw their invaders destroyed by the hostility of the elements; poisoned by the air, and crippled by the dews; where every hour swept away battalions; and in the three days that passed between the descent and re-embarkation half an army perished. In the last war the Havanna was taken, at what expense is too well remembered. May my country be never cursed with such another conquest." Yet Havanna, under American administration, has become one of the healthiest cities in the world.

Sir John Moore, when Governor of St. Lucia (1796), wrote home that it is not the climate that kills, but mismanagement. His insight has been demonstrated in the same region. The French attempt to build the Panama Canal was defeated by disease. Discovery of its nature enabled the late Surgeon-General Gorgas to secure for the 10,000 men, women and children in the canal construction camps, in spite of the high humid heat, as good health as they would have had in the United States. Gorgas claimed that the results at Panama "will be generally received as a demonstration that the white man can live and thrive in the tropics." Gorgas realised that the results for the future are even more momentous. He predicted that as "the amount of wealth which can be produced in the tropics for a given amount of labour is so much larger than that which can be produced in the temperate zone by the same amount of labour, that the attraction for the white man to emigrate to the tropics will be very great when it is appreciated that he can be made safe as to his health conditions at small expense. When the great valleys of the Amazon and of the Congo are occupied by a white population more food will be produced in these regions than is now produced in all the rest of the inhabited world."

### 4.—OLD-ESTABLISHED EUROPEAN SETTLEMENTS IN THE TROPICS.

Similar improvements are in progress elsewhere and explain why some white colonies have existed for long periods in the tropics without physical deterioration.

Two distinguished authorities on Equatorial South America—A. Russel Wallace and Richard Spruce—agree that under the Equator in Ecuador and northern Peru there are many Spaniards whose ancestors have lived there for centuries. Spruce says that some of Spanish families at Guayaquil (lat. 2°13′S.) are pure in race, and have maintained their physical fitness after centuries of residence under the Equator. In the West Indies there are various old-established European colonies. The island of Saba (17°38′N.) was occupied by the Dutch in 1644. The descendants of the original settlers still occupy it and, apart from some effects of in-breeding, are reported to be healthy and vigorous and incontestably pure in race. Some of the German colonies in Brazil are within the tropics, and though established as early as 1847 the settlers are in good physical condition; at Santa Katharina, in a low-lying part of the coast just south of the tropics, the 85,000 Germans are reported to have better health than the natives.

The European settlement in the tropics in the small island of Kissa, off Timor, is especially remarkable for its long survival, despite its small numbers and unfavourable circumstances. Eight Dutch soldiers and their wives were landed on Kissa in 1665 to hold it against the Portuguese. They were forgotten, but they established themselves, and their descendants now number over 300. The Admiralty Pilot describes the island as unhealthy and feverish. Nevertheless, the Dutch colony is said to be healthy, and many of its members have fair hair, blue eyes and blonde complexions. They retain the names of the original settlers, but they have lost their Dutch language and religion, and have adopted many native ways of life. A Dutch missionary, Rinnooij, has referred to the settlers as mestizos—*i.e.*, half-castes—and states that the soldiers took wives from the daughters of the land. His statements are quite inconsistent with the later and more detailed account by Professor Macmillan Brown. If the women of the colony had always been natives of Kissa, the survival of the light hair, eye, and skin appears inexplicable. Hence, though Macmillan Brown may have underrated the Malay infusion, it appears probable that this colony is mainly of Dutch stock, and has kept its physical characteristics undamaged by the two-and-a-half centuries of residence only eight degrees from the Equator.

Many cases of the decadence or extinction of ill-placed European colonies in the tropics are, of course, known, such as the Bahamas, as described by Professor Ellsworth Huntington. Such misfortunes have been regarded as evidence of the inevitably injurious effect of the tropical climate on white men. But if white colonies have maintained good health in the tropics, the failures are not caused by climate alone.

### 5.—The Development of Tropical Australia.

The experience of colonisation in tropical Australia is limited to about seventy years; but it affords no ground for the expectation that the ultimate effects on the white race will be detrimental.

(*a*) *Vital Statistics in Queensland.*—In Queensland, most of which is tropical, the death-rate is lower than in any European country, and is lower than in most of extra-tropical Australia. In the six years 1915-21, according to the statistics in the Australian Year-Book (No. 15, 1922, p. 99), the crude death-rate in Queensland was the lowest in the six Australian States for one year, and fourth of the six States in three years, and the fifth in three; it was not once the highest. In the same six years the infantile death-rate was lowest in Queensland in three years, and the second lowest in two others. According to the same authority, by Index of Mortality (*i.e.*, the death-rate in proportion to the ages of the community), Queensland was in 1921 the second State in order of merit, being inferior only by .03 to New South Wales, the State most favoured in this respect.

The physical vigour of the Queenslander is shown by his athletic prowess, anl by the low rejection-rate of recruits from that State for the Citizen Army. The longevity in Queensland may be judged by the experience of the life assurance offices. It has often been asserted that assurance rates show that tropical climates are unhealthy. Yet the chief actuary for the greatest Australian assurance company, the

Australian Mutual Provident Society, reported to the Committee of the Australian Medical Congress, "I have no hesitation in saying that as far as we know at present there is no need for life assurance offices to treat proponents who live in North Queensland differently from proponents who live in other parts of Australia."

Physical and mental degeneration in a people living under unfavourable conditions would probably be most readily observed in the children. To use this clue I asked the Queensland Education Department whether its inspectors had noticed any unfavourable symptoms among the children in the most tropical of its northern schools. The Department replied that, on the contrary, its schools at Cairns and Cooktown, two of the most northern towns, are exceptionally efficient, and one of them is sometimes the leading school in the State.

(*b*) *Northern Territory.*—The great success of Queensland, although more than half the State is within the tropics, renders the more striking the failure of the adjacent Northern Territory of Australia, of which the records are disappointing. Agriculture has declined; the Government demonstration farms have been reduced to native reserves; the meat works have been closed; the population has fallen in numbers; and mining production has become insignificant. The present state of the Territory has been adduced as evidence of the futility of trying to develop a tropical land by white labour. Its failure was not, however, due to the White Australia policy, which was introduced after the failure was complete, but to geographical disadvantages not yet surmounted. The Territory, before 1901, was open to Asiatic immigration, but the hope that it would be adequately peopled from Asia was not fulfilled. Its population was largest in 1888, and then it was only 7,533. The Chinese were the most numerous during the construction of the Pine Creek Railway in 1887-8; their numbers were 4,141 in 1890, and fell to 2,928 in 1900, and to 1,387 in 1910. High expectations had been formed of the Northern Territory from its tropical position. and it was hoped to become an Eldorado as an Australian Java. It was fondly called "the Land of the Dawning," and described as containing limitless areas of, for some purposes, the best land in the world. Searcy, for example, declared that it includes "land equal in size to the islands of Java and Madura, suitable for any sort of tropical agriculture."

Careful comparison with Java would, however, have served as a warning that easy prosperity was impossible. Java has been a densely peopled, highly cultivated island, with an advanced indigenous civilisation since prehistoric times. The Northern Territory of Australia has been throughout the same period practically an unoccupied deserted waste. Java has rich widespread soils and a convenient rainfall. The Northern Territory has in the main poor soils, and its rain all falls during five, and most of it during three months, leaving the land parched and scorched for seven months every year. The water from the wells is alkaline and the supply too small for extensive irrigation, while land irrigated with it is soon rendered sterile.

Poorness of soil, unsuitable distribution of rainfall, and inaccessibility of position explain the backwardness of the Northern Territory. Dr. Jensen, the former Government Geologist for the Territory, describes the agricultural resources as "circumscribed," the rich patches of lowland soil being "so wretchedly small and so few," while the larger areas are situated where they could "only be successfully cultivated by the installation of great irrigation schemes, which are not warranted, while equally good areas are available in other States with better climate, facilities, and markets." Great hopes are based on cotton, despite Dr. Jensen's pessimism regarding it. Its profitable cultivation appears dependent upon the establishment of a protected cotton manufacture in Australia, which would secure a market for the crop at a price that would pay for the high cost of picking.

The remedy for the failure of the Northern Territory lies not in another attempt with Asiatics, but in the removal of the isolation of the Territory. Two routes for railway connection are available—the completion of the Mid-Continental Line to South Australia, or the construction of a line past the Gulf of Carpentaria to Queensland. The route to Adelaide appears the more promising, as it would connect two areas so different that they would be complementary and not competitive; whereas the railway to Queensland would run through one climatic zone and would connect districts which yield the same products. No special advantage would accrue to Queensland for opening another tropical area; whereas a railway to Adelaide would connect localities in different climatic belts. While the only access to Port Darwin from the capital cities of Australia is by a voyage of 3,000 or 4,000 miles remote from either of the main steamer routes to Australia, the satisfactory development of the Northern Territory will be impossible.

(*c*) *Queensland and the Sugar Industry.*—Queensland, in contrast to the Northern Territory, has made firm progress; the population has continued to increase; and though at first coloured labour was introduced, the proportion of the Asiatic population in 1911 was only 1.47 per cent., and of the Polynesian only .29 per cent.

The numbers of coloured labourers in Queensland were too small seriously to affect the population, but they were sufficient to be a constant irritant and source of uncertainty in the local labour market. This trouble led, in 1900, to the prohibition of indentured coolie labour throughout Australia. This decision was supported by the great majority of the Queensland people in spite of the most emphatic warnings of disaster.

Some of the sugar estates are in localities with extreme tropical climates; and the Queensland Chambers of Commerce, members of Parliament, Farmers' Associations, and Bishops, declared that sugar could not be grown by white labour. The difficulty was said to be an absolute physical impossibility and not merely economic, so that the stoppage of Kanaka labour meant the certain death of the Australian sugar industry. At that time the sugar plantations were not prosperous, and exclusion of the Kanakas was supported on the ground that so struggling and unprofitable a branch of agriculture had better die rather than upset the policy of the whole continent.

The Bill for the exclusion of the South Sea islanders was, therefore, enacted and the sugar left dependent on white labour. In spite, however, of the confident predictions of the experts and their friends the industry has gone on and been more successful than when run by coloured labour.[3]

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[3] I gave an account of the progress of white labour on the plantations up to 1908, after a visit to four of the chief sugar-producing districts, in the *Nineteenth Century*, February, 1910, pp. 368—380; and in the Proc. R. Phil. Soc., Glasgow, Vol. xliii, 1912, pp. 182—194.

The returns of the industry are irregular. In some seasons the yield is good, as in the record year 1917-18, and more land is planted. An unfavourable planting season reduces the area under cultivation and the yields in the second and third years later. Comparisons of single years are uncertain; but the following table shows that the areas under cane and the quantity of sugar produced have increased greatly since the industry became dependent on white labour.

QUEENSLAND SUGAR PRODUCTION.

| | *Acreage.* | *Cane, Tons.* | *Sugar, Tons.* |
|---|---|---|---|
| 1900-1 | 108,535 | 848,328 | 92,554 |
| 1906-10 | 134,107 | 1,415,745 | 152,259 |
| 1910-11 | 141,779 | 1,840,447 | 210,756 |
| 1916-17 | 167,221 | 1,579,514 | 176,973 |
| 1917-18 | 175,762 | 2,704,221 | 307,714 |
| 1918-19 | 160,534 | 1,674,829 | 189,978 |
| 1919-20 | 148,469 | 1,258,760 | 162,136 |
| 1920-21 | 162,619 | 1,339,455 | 167,401 |

[The sugar yield for 1922 is reported as 188,000 tons.]

It may be said that the increase in output and area ought to have been larger, but it should be understood that the Queensland sugar industry is not situated under specially favourable natural circumstances, as the land suitable for sugar occurs in relatively small isolated areas. Hence, the cane has to be treated at forty scattered mills, and the work cannot be done as economically as if concentrated in a few places.

The Australian adoption of white labour for its sugar plantations has been the greatest contribution yet made to the practical solution of the problem whether the white man can do agricultural work in the tropics. The experiment shows that white labour can be employed successfully in such an ultra-tropical industry as sugar cultivation in even the ultra-tropical climate of the Queensland coastlands, provided the settlers are protected from infectious disease and from the competition of people with lower standards of life.

### 6.—RATE OF PROGRESS AND THE DRAWBACKS OF THE TROPICAL CLIMATE.

The results of the Australian decision in 1901 to discard coloured labour have shown that the daring policy then begun is practicable; but it may render development slow and costly. The slowness of the progress may be amply compensated by its sureness in the end. Some American authorities on migration (*cf.* H. P. Fairchild, "Immigration," 1923, pp. 215-225, 342) maintain that immigration during the past half-century into America has not added to the total population, as it has lowered the birth-rate of the older American stock, and merely substituted a very large foreign for a native element that would otherwise have come into being. An immediate increase caused by the introduction of a large number of Asiatics might mean a reduction in the European proportion in the Australian race, with in the end no increase in the total population.

The conclusion that white settlement of the tropics is possible should not lead to the drawbacks of a tropical climate being overlooked. The conditions where the wet-bulb temperatures are high are uncomfortable and unfavourable to mental and physical activity. People who are not keenly interested in their work should avoid the tropics. Ellsworth Huntington in a valuable series of works has called attention to many facts which show the dependence of Western civilisation on the stimulating nature of the temperate climate, for the frequent changes in temperature and wind are conducive to alertness and general efficiency.

The enervating effect of the tropical climate is no doubt counterbalanced by various compensations. Man needs less in food, fuel, clothing, and housing, while the same amount of exertion will produce a more luxuriant and valuable crop. The supremely fertile tropical regions have, however, usually a hot, muggy climate, which is not attractive to Europeans while areas with less trying conditions are available. Northern Australia, even if it were not hampered by a high proportion of poor land, would naturally develop slowly, just as in Canada the Northern Territory and the rocky backwoods have lagged behind the St. Lawrence basin and the rich-soiled western plains.

The natural development of tropical Australia would be by overflow from the south when that part of the continent is more adequately peopled. Progress could be best aided by opening routes to tempt those with pioneering instincts to wander northward. This process may be considered too slow by those who consider the immediate occupation of tropical Australia a political necessity in order to prevent its annexation by some Asiatic Power; but the alarms based on Asiatic designs against Australia ignore the vast empty areas in Asia, the rich lands that could be more easily acquired in the Eastern Archipelago, and the persistence with which the people of south-eastern Asia have shunned areas in their own continent under geographical conditions corresponding to those of most of tropical Australia.

## 7.—CONCLUSION.

The conclusion that the white man is not physiologically disqualified from manual labour in the tropics and may colonise any part of Australia simplifies inter-racial problems, as it provides an additional outlet and spacious home for the European race.

The preceding survey of the position where the three main races meet in intimate association indicates that the world will have a happier and brighter future if it can avoid the co-residence in mass of members of the different primary divisions of mankind. Individual association and contact should secure for each race the benefit of the intellectual, artistic, and moral talents of the others; while industrial co-operation should aid each nation to make the best use of the land in its care.

The world has reached its present position by the help of each of its three great races, and it still needs the special qualities of each of them. The contemplative Asiatic founded all the chief religions, the ethical basis of civilisation. The artistic Negro probably gave the world the gift of iron, the material basis of civilisation. The administrative genius of the European race has organised the brain power of the world to its most original and constructive efforts. The affectionate, emotional Negro, the docile, diligent Asiatic, and the inventive, enterprising European do not, however, work at their best when associated in mass. That association is attended with serious difficulties; for race amalgamation, which is the natural sequel, is abhorrent to many nations, and the intermarriage of widely different breeds, according to many authorities, produces inferior offspring. The policy of co-residence with racial integrity has failed to secure harmonious progress in North America and South Africa. The development of the best qualities of the three races requires their separate existence as a whole, with opportunities for individual association and co-operation.

In view of the inter-racial difficulties that have developed wherever the races are intermingled, Australia will throw away a unique opportunity if it fails to make a patient effort to secure the whole continent as the home of the white race.

# REPORT OF DELEGATE TO THE BRITISH ASSOCIATION, TORONTO, AUGUST 6TH-13TH, 1924.

THE Conference of Delegates of Corresponding Societies of the British Association met on Tuesday, July 22nd, 1924, in the Conference Hall of the British Empire Exhibition at Wembley, instead of during the ordinary meetings of the Associations, which were held at Toronto, August 6th-13th.

The Presidential Address (Section E.—Geography) by Prof. J. W. Gregory, F.R.S., on " Inter-Racial Problems and White Colonisation in the Tropics," is given on page 153. A series of papers, largely contributed by Canadian geographers, dealt with various aspects of cartography, especially with regard to the topographical, geodetic and tidal surveys of Canada.

Dr. Joerg, of the American Geographical Society, reviewed in his paper on "Human Use *versus* Natural Regions," the various methods of regional sub-division adopted in geographical studies. His plea for the appointment of a Committee of the Association of American Geographers to delimit the "geographic provinces" of the United States and Canada might well be extended to a general enquiry among geographers of the basis for geographical divisions, as distinct from " natural " or " physiographic " regions for the major land masses of the world.

Prof. Roxby's paper on the " Distribution of Population in China " and the contribution of Messrs. T. Adams and H. L. Seymour on "Some Problems of Urban Growth in America " formed excellent commentaries on major and minor geographic regions.

During the meetings many opportunities occurred for discussing with American geographers matters of mutual interest. Among those present were C. F. Brooks, C. C. Colby, W. M. Davis, N. M. Fenneman, W. L. G. Joerg, and Miss E. C. Semple

The Trans-Continental journey was made westwards by the C.N.R. and eastward by the C.P.R. It is not possible adequately to express the care with which arrangements were made in order that the maximum investigation might be made by members of the different Sections in the time available.

W. H. BARKER.

## HONOURS SCHOOL OF GEOGRAPHY.

THE Society has long urged on the citizens of Manchester in general, and on the University in particular, the desirability of a School of Geography where geographical research could be prosecuted. The world-wide interests of Lancashire, both for food and raw materials no less than for markets for its manufactured products, must give a geographical turn to our interests and our outlook. It is, therefore, a matter of profound satisfaction to learn that the University has instituted an Honours School in Geography, and has proceeded to equip it to the full extent of available resources. The courses of study which lead to the degree in Geography ensure a sound educational basis, with ample opportunity for detailed study in Geography.

During the first year, the principal courses are general introductory studies to geography, geology, history and political economy. The second year is devoted to a somewhat detailed study of three of the major regions of the world, such as Europe and North America, the Far East and Tropical Africa. The British Isles necessarily come in for special treatment. In the third year the students become acquainted with the magnificent regional work on France carried out by a brilliant school of geographers inspired by such men as Vidal de la Blache, Brunhes, and Schrader. In this year, too, some investigation is made into those far-reaching problems which rest so largely on a geographical basis. The Mills Collection of Maps (see p. 1) makes possible an additional course also on the history of geographical discovery.

More recently still the University has added Geography to the subjects which may be offered for the ordinary degree of B.Sc. A new scheme which comes into operation in October, 1925, enables geography to be offered with geology for an Honours degree in Science.

Geography has now to prove its worth and justify the position in which it is placed in the University. But we cannot ask the University to make bricks without straw. An adequate and competent staff can only be attracted by good salaries; the rapidly changing conditions of the modern world involve continuous additions to the source material and literature; and maps and such like cumbersome documents require adequate accommodation for their usage and storage. It is not too much to expect Lancashire to subscribe such a sum that the University can carry through its self-appointed task. The Society offers the University its congratulations and wishes it all success.

No doubt many of the first candidates for geographical degrees will be teachers, who will disseminate sound geographical knowledge in our schools. It is not too much to hope, however, that soon more Lancashire men will begin to occupy important administrative posts in our Crown Colonies, and that those who travel abroad in a commercial capacity will be able, with their geographical training, to observe and to gather information on the life and labour of foreign people which can be pooled for the common good in the School of Geography.

# Proceedings.

## ANNUAL MEETING, 1923.

The 38th Annual Meeting of the Society was held, by kind permission of the Lord Mayor of Manchester, in the Lord Mayor's Parlour at the Town Hall, on Friday, May 11th, 1923, at 3 o'clock p.m.

In the absence of the Lord Mayor, Mr. E. W. Mellor, F.R.G.S., F.R.P.S., President of the Society, took the chair, and there were present: Mr. W. H. Barker, B.Sc., F.R.G.S., Mrs. Barker, Mrs. Barnes, Mrs. Burrows, Mr. I. Chorlton, Colonel Hy. T. Crook, V.D., D.L., Miss Crook, Colonel E. W. Greg, C.B., F.R.G.S., Messrs. T. Gregory, J.P., J. Howard Hall, Rev. J. Gordon Hayes, M.A., Messrs. Holden, Ingham, Mrs. Ingham, Mrs. Joliffe, Mrs. F. E. Jones, Miss M. E. Jones, Miss R. E. Jones, Mrs. Lamb, Mr. A. W. Longden, Mrs. Longden, Messrs. J. H. Macready, T. W. F. Parkinson, M.Sc., M.Ed., F.G.S., J. W. Price, F.R.G.S., Mrs. Sowerbutts, Miss Sowerbutts, Mr. H. Staniforth, Mrs. Stordy, Mr. G. Swithenbank, Dr. W. Thomson, F.R.S.Ed., Mr. A. A. Tulk, Miss L. Edna Walter, M.B.E., B.Sc., H.M.I., Mrs. Wilkinson, and the Secretary.

Apologies for absence were received from the Right Hon. the Lord Mayor, Messrs. H. Nuttall, F.R.G.S., J. E. Balmer, F.R.G.S., T. A. Edwards, F.R.G.S., F, B. Osborne, M.A., Richard Kay, F.R.G.S., and D. A. Little.

The Minutes of the last Meeting were approved.

The Secretary then presented the Report and Balance Sheet:—

## REPORT OF THE COUNCIL

### For the Year ended December 31st, 1922.

The Council have the pleasure to submit their report on the proceedings of the Society during the year.

The weekly meetings have again been well attended, on many occasions the Hall having been filled to its utmost capacity.

The issue of the Journal for 1921 has been delayed through pressure of other activities and shortage of staff. The Council propose to publish in the coming year the Volumes for 1921 and 1922 together.

The continuous growth of the Library and Map Collection makes it more difficult each year to find space for the valuable additions which are being constantly received.

The collection of Lantern Slides, now about 14,000, has been used by and on behalf of members to a much greater degree than ever.

The Victorians have, as usual, given most valuable help by the delivery of Lectures, the organisation of Social Gatherings, the acquisition of Lantern Slides and in other directons.

It is a great pleasure to the Council to note the increased activity in the Department of Geography at the University. A scheme for the establishment of an Honours School in Geography within the Faculty of Arts at the opening of the coming Session, and one for the inclusion of Geography as a subject for the final Examination for the B.Sc., have received the approval of the Council of the University, and will be laid before the Court of Governors at their next meeting.

Furthermore, Geography has been approved as a subject for the entrance scholarship of the University, the new regulation to come into operation for the examination held in 1924. These changes should tend towards the development of even greater interest in the appeal for funds to enable the University to provide a Chair of Geography in the near future. It will be within the knowledge of the Members that the President, Mr. E. W. Mellor, has started this fund with a generous gift of £1,000, and though the sums promised by other members of the Society have not yet doubled this it is hoped that further promises may be received so that an extended appeal may be made to the community generally to ensure that the project shall not fail for the lack of financial assistance. The importance of a proper scheme of geographical study, teaching and research to this district cannot be over-estimated.

Towards the close of the year arrangements were made to hold an Exhibition of Maps in conjunction with the University in the Whitworth Hall at the end of January 1923, and although the actual event does not fall within the year under review, still it may be mentioned that the Exhibition, opened by Sir Frederick D. Lugard, G.C.M.G., C.B., D.S.O., was a great success, arousing interest in all parts of the country, and was attended by thousands of visitors. Thanks are due to Colonel Dudley Mills and to Mrs. Booker for the loan of maps.

The Annual Dinner of the Society was arranged to coincide with the holding of the Exhibition, when the guests included Sir Frederick D. Lugard, Dr. W. W. Atwood (President of the Clark University, Worcester, U.S.A.), Sir George Fordham, Colonel Dudley Mills, and Sir Henry A. Miers.

The Accounts for the year 1922, with the Certificate of the Honorary Auditor, are appended. Through the exercise of care and economy the Revenue Account shows a credit balance of £19 16s. 11d. The generous donation of £200 by the President, and other gifts place the Society in the position of being able to meet its current obligations which has not been the case for many years. An expression of sincere thanks to Mr. Mellor for this timely gift has been forwarded by the Council.

During the year the Membership has fallen from 651 to 648. While this is not a serious decrease, the Council would urge upon the members the necessity of obtaining a large increase in number so as to enable the Society to carry out more efficiently the important work waiting to be done in furthering the interests of Geography in Manchester and the surrounding districts.

It is with deep regret that the Council have to record the loss by death, during the past year, of a greater number of members than usual :—

Mr. Charles Brier.
Sir E. Tootal Broadhurst, D.L., J.P.
Mr. C. F. Collmann.
Mr. W. L. Crawford.
Miss Dodson.
Mr. Charles Duckworth.
Alderman John Griffiths.
Mr. Anthony Hailwood, J.P.
Mr. James Hindle, L.R.A.M.
Dr. Edward Hopkinson, M.P.
Rt. Rev. Bishop Mercer.
Mr. W. H. Ormerod, J.P.
Mr. Edward Pilkington, J.P.
Sir Ernest Shackleton, C.V.O., F.R.G.S.
Mr. S. Sternberg.
Mr. John Stevenson.
*Mr. Fred Taylor.

* Original Member.

## REVENUE ACCOUNT, Year ended December 31st, 1922.

| Dr. | £ s. d. | Cr. | | £ s. d. |
|---|---|---|---|---|
| To Expenses of Meetings | 129 19 0 | By Members' Subscriptions :— | | |
| „ Journal, Vol. XXXVII, *less* receipts | 78 14 2 | Life Transferred to Reserve Account | £15 0 0 | |
| „ Rent, Lighting and Insurance | 132 1 5 | | | |
| „ Salary | 130 10 0 | Ordinary | £616 10 0 | |
| „ Wages | 162 5 8 | Associate | 75 0 0 | |
| „ Sundry Expenses | 48 16 10 | Societies | 10 10 0 | |
| „ Books, Maps, etc., Library | 4 11 0 | Students | 6 6 0 | |
| „ Repairs | 2 3 9 | | | 708 6 0 |
| „ Balance carried down | 19 16 11 | „ Bank Interest | | 0 12 9 |
| | £708 18 9 | | | £708 18 9 |
| To Balance carried to Balance Sheet | 230 16 11 | By Balance brought down | | 19 16 11 |
| | | „ Donation by Mr. E. W. Mellor, J.P., F.R.G.S., F.R.P.S. | | 200 0 0 |
| | | „ Share in Building Company presented by Mr. H. C. Martin, F.R.G.S. | | 10 0 0 |
| | | „ Investment Depreciation Account adjustment | | 1 0 0 |
| | £230 16 11 | | | £230 16 11 |

Note.—The Furniture, Fittings, Books, Maps, Lantern, Slides, and Stock of Journals which are insured for £2,000, are not included as Assets in the Balance Sheet. There are 50 Life Members (including two Honorary), and the Subscriptions of 23 of this number have been taken as income in the years prior to 1906

# BALANCE SHEET, December 31st, 1922.

| LIABILITIES. | | £ s. d. |
|---|---|---|
| To Sundry Creditors | | 124 0 10 |
| „ Subscriptions Paid in Advance :— | | |
| Ordinary | £47 5 6 | |
| Associates | 15 0 0 | |
| Students | 2 2 0 | |
| | | 64 7 6 |
| „ Life Membership Reserve Account | | 276 15 0 |
| „ Kirkpatrick Endowment Fund | | 50 0 0 |
| „ Eli and Emma Sowerbutts Memorial Fund | | 150 0 0 |
| „ Harry Sowerbutts Memorial Fund | | 191 8 9 |
| „ John Walkden Memorial Fund : Balance unexpended | | 4 17 3 |
| „ Balance :— | | |
| Brought from last Account | £221 12 6 | |
| Add Net Surplus, 1922 | 230 16 11 | |
| | | 452 9 5 |
| | | £1,313 18 9 |

| ASSETS. | | £ s. d |
|---|---|---|
| By 207 Shares, £10 each fully paid, in the M.G.S.B. Coy., Ltd. | | |
| 74 Purchased at cost | £235 0 10 | |
| 133 Presented nominal value | 1,320 0 0 | |
| | 1,565 0 10 | |
| *Less* Depreciation | 530 0 10 | |
| | | 1,035 0 0 |
| „ Subscriptions in Arrear—Ordinary | | 12 0 0 |
| „ Harry Sowerbutts Memorial Fund :— | | |
| National War Bonds, 1927 | £147 1 7 | |
| Cash at Bank | 44 7 2 | |
| | | 191 8 9 |
| „ Cash in Bank | | 72 5 9 |
| „ Cash in Hand | | 3 4 3 |
| | | £1,313 18 9 |

## AUDITOR'S CERTIFICATE.

I have audited the above Balance Sheet, and certify same to be correct. I have examined and found to be in order the Certificates representing the Shares in the Manchester Geographical Society Building Company, Limited above set forth.

JOHN THOMASON, Chartered Accountant,
*Hon. Auditor*

Manchester,
14th April, 1923

The Chairman then proposed: "That the Report of the Council and the Balance Sheet for 1922, as now submitted, be approved and adopted."

Mr. W. H. Barker, B.Sc., F.R.G.S., seconded the motion, and it was carried unanimously.

Mr. J. W. Price, F.R.G.S., proposed: "That the Officers and Council, as nominated, be and are hereby elected."

This was seconded by Mr. E. Swithenbank, J.P., and the following were then unanimously elected as Officers and Council for 1923-1924:—

**Patron.**

HIS MAJESTY THE KING.

**President.** Colonel HENRY T. CROOK, J.P., V.D., D.L., M.Inst.C.E.

**Past-Presidents.**

Mr. HARRY NUTTALL, J.P. F.R.G.S.
Mr. E. W. MELLOR, J.P., F.R.G.S., F.R.P.S.

**Vice-Presidents.**

The Right Hon. the EARL OF DERBY, K.G., G.C.V.O.
The Rt. Rev. the BISHOP OF SALFORD.
Sir HENRY A. MIERS, D.Sc., F.R.S., Vice-Chancellor of the University.
The Right Hon. the LORD MAYOR OF MANCHESTER.
His Worship the MAYOR OF SALFORD.
Sir C. W. MACARA, Bart., J.P.
Sir JOHN S. RANDLES, M.P.
Sir H. F. DE TRAFFORD, Bart.
Mr. JOHN AINSWORTH, C.M.G., C.B.E., D.S.O., F.R.G.S.
Captain W. C. BACON, Chairman Ship Canal Company.
Mr. J. E. BALMER, F.R.G.S.
Hon. Prof. Sir W. BOYD DAWKINS, J.P., F.R.S.
Mr. HENRY FILDES, M.P.
Colonel E. W. GREG, J.P., C.B., F.R.G.S.
Mr. THEODORE GREGORY, F.C.A., J.P.
Mr. J. S. HIGHAM, J.P.
Mr. T. O. JACOBSEN, J.P., L.C.C., F.R.G.S.
Mr. DAVID A. LITTLE.
Lt-Col. JOSEPH NALL, D.S.O., M.P.
Mr. GEORGE THOMAS, J.P.
Professor T. F. TOUT, M.A., F.B.A.

**Trustees.**

Mr. HARRY NUTTALL, J.P., F.R.G.S. Mr. SIDNEY L. KEYMER. F.R.G.S
Mr. E. W. MELLOR, J.P., F.R.G.S., F.R.P.S.

**Hon. Treasurer.** Mr. DAVID A. LITTLE.

**Hon. Editor.** Mr. EGBERT STEINTHAL.

**Hon. Secretaries.**

Mr. W. H. BARKER, B.Sc., F.R.G.S. Mr. T. W. F. PARKINSON, M.Sc. M.Ed., F.G.S.

**Hon. Secretary (Victorians).** Mr. C. A. CLARKE.

### Council.

Mr. JOSEPH BERRY.
Mr. ANTHONY BURGON.
Mr. T. A. EDWARDS, F.R.G.S.
Mr. GEORGE GINGER.
Mr. J. HOWARD HALL.
Rev. J. GORDON HAYES, M.A.
Mr. R. W. JAMES, M.A., B.Sc.
Mr. RICHARD KAY, F.R.G.S.
Mrs. H. L. LEES, F.R.G.S., F.R.C.I.
Mr. H. C. MARTIN, F.R.G.S.
Captain L. E. MATHER, F.R.G.S.
Mr. F. B. OSBORNE, M.A.
Mr. EWIN PICKSTONE.
Miss KATE QUALTROUGH, F.R.G.S
Mr. J. R. RAGDALE, C.A., J.P.
Mr. ALFRED REE, Ph.D.
Mr. J. STEPHENSON REID.
Mr. J. WALTER ROBSON, J.P.
Mr. R. A. STANIFORTH.
Mr. WILLIAM THOMSON, F.R.S.Ed.
Miss L. EDNA WALTER, M.B.E., B.Sc., H.M.I.

Mr. Mellor then invited Colonel Hy. T. Crook, V.D., D.L., to take the chair, and congratulated him upon having attained to a position he had well merited, and for which his extensive services had so well fitted him.

In the course of his remarks, in acknowledgment, Colonel Crook made a reference to the increased activity in the Department of Geography at the University. A scheme for the establishment of an Honours School in Geography within the Faculty of Arts at the opening of the coming session, and one for the inclusion of Geography as a subject for the final examination for the B.Sc., had received the approval of the Council of the University and would be laid before the Court of Governors at their next meeting. Further, Geography had been approved as a subject for the entrance Scholarship of the University, the new regulation to come into operation for the next examination held in 1924. These changes should tend towards the development of a greater interest in the appeal for funds to enable the University to provide a chair of Geography in the near future.

Dr. W. Thomson, F.R.S.Ed., proposed: "That the best thanks of the Society be tendered to Mr. John Thomason, A.C.A., for his services as Honorary Auditor for the past year, and that he be hereby re-elected."

This was seconded by Mr. H. Staniforth, and carried unanimously.

Mr. Theodore Gregory, J.P., moved: "That the best thanks of the Society be tendered to the Right Hon. the Lord Mayor for the use of the Parlour, and to the Lady Mayoress for her kindness in inviting her fellow-members to tea at the close of the Meeting."

This was seconded by the Rev. J. Gordon Hayes, M.A., and carried unanimously.

## ORDINARY MEETINGS, 1923.

| 1923. | | Lecturer. | Subject. | Chairman. |
|---|---|---|---|---|
| Jan. | 9. | J. Ernest Phythian, M.A. | Imperial Ravenna. | Col. Hy. T. Crook, V.D., D.L. |
| ,, | 16. | W. H. Barker, B.Sc., F.R.G.S. | Some Notes on fac-simile Maps and Globes in Relation to Geographical Discovery. | do. |
| ,, | 23. | Albert Wilmore, D.Sc., F.G.S., F.R.G.S. | An Hour with British Rivers. | do. |
| ,, | 30. | Charles Sutton, F.A.I. | Some Tuscan Cities. | Ewin Pickstone. |
| Feb. | 6. | Harold Feber, B.Sc., M.I,H., F.R.G.S, | From the Heights of the Andes to the Panama Canal. | Col. Hy. T. Crook, V.D., D.L. |
| ,, | 13. | John Hilditch, F.R.G.S., M.R.A.S. | Chinese Temples and Palaces. | do. |
| ,, | 20. | Rev. J. H. Burkitt. | Grindelwald and the Bernese Oberland. | do. |
| ,, | 27. | Oliver Brockbank, M.A. | The Samson Country and the Decapolis. | do. |
| Mar. | 6. | J. W. Price, F.R.G.S. | In the Heart of Afghanistan. | do. |
| ,, | 13. | E. Arnold Pochin, A.M.I.Mech.E. | Tramps on the Lake District Mountains. | do. |
| ,, | 20. | C. H. Creasey, H.M.I. | A Survey of the Chief Irrigation Systems of the World | do. |
| ,, | 23. | Miss Margaret A. Murray. | Notes on my recent Excavations in Malta. | E. W. Mellor, F.R.G.S., F.R.P.S. |
| ,, | 27. | H. Valentine Davis. B.Sc. | Mont Blanc and the Vale of Chamonix. | Col. Hy. T. Crook, V.D., D.L. |
| Oct. | 2. | Rev. G. W. Kerr, B.A., LL.D. | Morocco and Algeria. | do |
| ,, | 9. | Rev. John H. Martin, M.A. | Chili. | do. |
| ,, | 12. | Rev. J. Gordon Hayes, M.A. | The Exploration of Antarctica. | E. W. Mellor, F.R.G.S., F.R.P.S. |
| ,, | 16. | Rev. Canon G. R. Vallings, D.S.O. | Some Pictures of the Yangtse Kiang. | Col. Hy. T. Crook, V.D., D.L. |
| ,, | 23. | H. Valentine Davis, B.Sc. | Studies in Snowdonia. | do |
| ,, | 30. | Ald. J. R. Ragdale, J.P. | Recent Visit to the Mediterranean. | do. |
| Nov. | 6. | W. Leonard Flinn, F.R.G.S. | Medes and Persians. | do. |
| ,, | 13. | W. H. Barker, B.Sc., F.R.G S. | East Africa and the Cape-Cairo Route. | do. |
| ,, | 16. | Prof. P. M. Roxby. M.A. | Some Factors in the Reconstruction of China. | do. |
| ,, | 20. | Rev. J. H. Burkitt. | Genoa, Naples and Pompeii. | do. |
| ,, | 27. | Dr. Mercier Gamble, M.B.E. | In the Old Kingdom of Kongo. | Ald. J. R. Ragdale, J.P. |
| Dec. | 4. | Miss E. M. Sanders. | Roumania. | Col. Hy. T. Crook, V.D., D.L. |
| ,, | 11. | C. J. Gregory, B.Sc. | The Alpine Tibetan-Chinese Borderland. | do |
| ,, | 18. | J. D. Berwick. | Through Derbyshire Dales. | do. |

## ANNUAL MEETING, 1924.

THE 39th Annual Meeting of the Society was held, by kind permission of the Lord Mayor of Manchester, in the Lord Mayor's Parlour, at the Town Hall, on Friday, May 23rd, 1924, at 3 o'clock p.m.

The Lady Mayoress (Miss A. M. Jackson) presided, and was supported by the President, Colonel Hy. T. Crook, V.D., D.L., Messrs. E. Barlow, J. Berry, A. Calligan, Mrs. Collier, Lieut.-Col. Crook, Miss Crook, Messrs. Eccles, C. T. I. Garner, G. Ginger, T. Gregory, J.P., J. Howard Hall, Mrs. Heathcote, Mr. F. Heinrich, Mrs. Lamb, the Misses Murray, Messrs. F. B. Osborne, M.A., J. W. Price, F.R.G.S., J. Rogerson, Mrs. Sowerbutts, Miss Sowerbutts, Messrs. H. Staniforth, E. Swithenbank, J.P., Miss Tinker, Miss Varley, Mr. W. H. Zimmern, and the Secretary.

Apologies for absence were received from Mr. E. W. Mellor, F.R.G.S., F.R.P.S., who was travelling in Spain, Mr. J. E. Balmer, F.R.G.S., detained in London, Colonel E. W. Greg, C.B., F.R.G.S., and Mr. Richard Kay, F.R.G.S.

The Minutes of the last Meeting were adopted, and the Secretary read the Report of the Council:—

## REPORT OF THE COUNCIL

### FOR THE YEAR ENDED DECEMBER 31ST, 1923.

The Council have the pleasure to submit their report on the proceedings of the Society during the year.

The weekly meetings have again been well attended, on many occasions the Hall having been filled to its utmost capacity.

Through pressure of other activities and shortage of staff the issue of the Journal has been delayed; but the Volume for 1921 and 1922 should be in the hands of the members before this report is presented, and it is hoped to bring the issue up to date during the year.

The continuous growth of the Library and Map Collection makes it more difficult each year to find space for the valuable additions which are being constantly received.

The collection of Lantern Slides, now about 15,000, has been used by and on behalf of members to a much greater extent than ever.

The Victorians have, as usual, given most valuable help by the delivery of Lectures, the organisation of Social

Gatherings, the acquisition of Lantern Slides and in other directions.

The prominent event of the year covered by this report was the Exhibition of Maps at the Whitworth Hall, a short notice of which was added to the report of 1922.* But the Exhibition, in the promotion of which the University and the Society collaborated, is worthy of a fuller record; it marked a first step towards arousing in this great commercial centre a deeper interest in geographical knowledge so requisite in these days of world-wide competition, and the necessity for adequate support in the provision of the means of instruction, study and research in the ever expanding field of this science.

The Accounts for the year 1923, with the Certificate of the Honorary Auditor, are appended. In consequence of a reduction in the Subscription Income, the increased cost of Lectures and in the estimated cost of the Journal, there is a deficit of £45 16s. 8d. for the year. It would only require a net increase of thirty members to adjust the Balance.

The Membership on the 1st January, 1923, was 648, there have been 73 new members elected, and a loss by death of 18, and by withdrawals of 65, leaving the number on December 31st at 638. The importance of the work being done, and of the further opportunities for service, ought to appeal to the community of a city like Manchester to ensure that the Society should not be crippled for lack of a sufficient membership.

It is with deep regret that the Council have to record the loss by death, during the past year, of the following members:—

Alfred Balmforth.
†John R. Barlow, M.A., J.P.
J. Annan Bryce.
Richardson Campbell.
Ald. Richard Greenough.
Joseph Hackney.
Walter Higginbottom.
Walter Moscrop.
†T. Bouchier Moxon.
Wm. Nichol.
Miss B. Ormrod.
James Robertshaw.
W. J. Robertson.
Wm. Thomson, F.R.S.Ed., F.I.C.
T. Wrathmell.

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* See also p. 1.

†Original Members.

## REVENUE ACCOUNT, Year ended December 31st, 1923.

| Dr. | £ s. d. | Cr. | | £ s. d |
|---|---|---|---|---|
| To Expenses of Meetings | 146 15 3 | By Members' Subscriptions:— | | |
| „ Journal, Vol. XXXVIII, *less* receipts | 104 1 3 | Life Transferred to Reserve Account | £20 0 0 | |
| „ Rent, Lighting and Insurance | 153 14 2 | | | |
| „ Salary | 130 10 0 | Ordinary | £591 12 0 | |
| „ Wages | 136 15 8 | Associate | 77 12 6 | |
| „ Sundry Expenses | 53 1 3 | Societies | 10 10 0 | |
| „ Books, Maps, etc., Library | 2 12 9 | Students | 3 3 0 | |
| „ Repairs | 3 5 10 | | | 682 17 6 |
| | | „ Bank Interest | | 2 2 0 |
| | £730 16 2 | „ Balance carried down | | 45 16 8 |
| To Balance brought down | 45 16 8 | | | £730 16 2 |
| „ Balance carried to Balance Sheet | 56 13 4 | | | |
| | | By donation by Mr. George Thomas, J.P.:— | | |
| | | 20 Shares British Cotton Growing Association, Ltd. | | 20 0 0 |
| | | „ Investment Depreciation Account adjustment | | 82 10 0 |
| | £102 10 0 | | | £102 10 0 |

NOTE.—The Furniture, Fittings, Books, Maps, Lantern Slides, and Stock of Journals which are insured for £2,000, are not included as Assets in the Balance Sheet. There are 49 Life Members (including two Honorary), and the Subscriptions of 22 of this number have been taken as income in the years prior to 1906.

# BALANCE SHEET, December 31st, 1923.

| LIABILTIES. | | £ s. d. |
|---|---|---|
| To Sundry Creditors ... ... ... .. ... ... ... | | 225 6 8 |
| „ Subscriptions Paid in Advance :— | | |
| Ordinary ... ... ... ... ... ... | £56 5 6 | |
| Associates ... ... ... ... ... | 11 5 0 | |
| Students ... ... ... ... ... ... | 3 3 0 | |
| | | 70 13 6 |
| „ Life Membership Reserve Account ... ... ... ... | | 296 15 0 |
| „ Kirkpatrick Endowment Fund ... ... ... ... ... | | 50 0 0 |
| „ Eli and Emma Sowerbutts Memorial Fund ... ... ... | | 150 0 0 |
| „ Harry Sowerbutts Memorial Fund ... ... ... ... | | 199 9 7 |
| „ John Walkden Memorial Fund : Balance unexpended ... | | 4 17 3 |
| „ Manchester University Chair of Geography Fund :— | | |
| Donations received (see list appended) ... | £1523 9 5 | |
| *Less* Remitted to the University ... ... | 1500 0 0 | |
| | | 23 9 5 |
| „ Balance :— | | |
| Brought from last Account ... ... ... | £452 9 5 | |
| Add Net Surplus, 1923 ... ... ... | 56 13 4 | |
| | | 509 2 9 |
| | | £1,529 14 2 |

| ASSETS. | | £ s. d |
|---|---|---|
| By 237 Shares, £10 each fully paid, in the M.G.S.B. Coy., Ltd. | | |
| 104 Purchased at cost ... ... ... ... | £285 0 10 | |
| 133 Presented nominal value ... ... ... | 1,330 0 0 | |
| | 1,615 0 10 | |
| „ British Cotton Growing Association, Ltd., 20 Shares at £1 each ... ... ... ... | 20 0 0 | |
| | 1,635 0 10 | |
| *Less* Depreciation ... ... ... ... | 447 10 10 | |
| | | 1,187 10 0 |
| „ Subscriptions in Arrear—Ordinary ... ... | £22 10 0 | |
| Associate ... ... | 1 10 0 | |
| | | 24 0 0 |
| „ Harry Sowerbutts Memorial Fund :— | | |
| National War Bonds, 1927 ... ... ... | £147 1 7 | |
| Cash at Bank ... ... ... ... ... | 52 8 0 | |
| | | 199 9 7 |
| „ Manchester University Chair of Geography Fund :— | | |
| Cash at Bank ... ... ... ... ... ... .. | | 23 9 5 |
| „ Cash in Bank ... .. ... ... .. . . ... | | 89 17 1 |
| „ Cash in Hand ... ... ... ... ... ... .. | | 5 8 1 |
| | | £1,529 14 2 |

## AUDITOR'S CERTIFICATE.

I have audited the above Balance Sheet, and certify same to be correct. I have examined and found to be in order the Certificates representing the Shares in the Manchester Georgraphical Society Building Company, Limited above set forth

JOHN THOMASON, Chartered Accountant,
*Hon. Auditor.*

Manchester,
14th February, 1924

# CHAIR OF GEOGRAPHY FUND.

## DONATIONS RECEIVED TO DECEMBER 31ST, 1923.

| | £ | s. | d. |
|---|---|---|---|
| E. W. Mellor, J.P., F.R.G.S., F.R.P.S. | 1000 | 0 | 0 |
| Colonel E. W. Greg, C.B., F.R.G.S. | 100 | 0 | 0 |
| Harry Nuttall, J.P., F.R.G.S. | 100 | 0 | 0 |
| Sir John S. Randles, J.P. | 50 | 0 | 0 |
| W. H. Whitby | 50 | 0 | 0 |
| George Thomas, J.P. | 31 | 10 | 0 |
| Henry Boddington, J.P. | 30 | 0 | 0 |
| W. G. Groves, J.P. | 25 | 0 | 0 |
| Captain L. E. Mather, F.R.G.S. | 25 | 0 | 0 |
| Mrs. H. L. Lees, F.R.G.S., F.R.C.I. | 10 | 10 | 0 |
| J. E. Balmer, F.R.G.S. | 10 | 0 | 0 |
| 1307 | 10 | 0 | 0 |
| Richard Kay, F.R.G.S. | 5 | 5 | 0 |
| F. B. Osborne, M.A. | 5 | 5 | 0 |
| John Ainsworth, C.M.G., C.B.E. | 5 | 0 | 0 |
| J. Herbert Cooke | 5 | 0 | 0 |
| George Ginger | 5 | 0 | 0 |
| C. V. Haerem | 5 | 0 | 0 |
| D. A. Little | 5 | 0 | 0 |
| Colonel S. L. Mandleberg, J.P. | 5 | 0 | 0 |
| Sidney Smith | 5 | 0 | 0 |
| Joseph Woolfenden | 5 | 0 | 0 |
| Joseph Berry | 2 | 2 | 0 |
| A. H. Booth | 2 | 2 | 0 |
| Miss A. Gregson, B.Sc. | 2 | 2 | 0 |
| W. N. Jago (first instalment) | 2 | 2 | 0 |
| Miss B. Ashton | 1 | 1 | 0 |
| Miss Foden | 1 | 1 | 0 |
| Miss E. Garlick | 1 | 1 | 0 |
| Miss C. Marsh | 1 | 1 | 0 |
| K. I. Marshall | 1 | 1 | 0 |
| H. E. O'Neill, F.R.G.S. | 1 | 1 | 0 |
| Miss N. Pollitt | 1 | 1 | 0 |
| F. W. Roberts | 1 | 1 | 0 |
| E. Swithenbank, J.P. | 1 | 1 | 0 |
| Miss Maud Talbot, M.A., M.Ed. | 1 | 1 | 0 |
| Miss F. M. Taylor | 1 | 1 | 0 |
| Mrs. Lily Taylor | 1 | 1 | 0 |

| | | | |
|---|---|---|---|
| Miss Tinker ... ... ... ... ... ... | 1 | 1 | 0 |
| Arnold Williams, M.P. ... ... ... ... ... | 1 | 1 | 0 |
| A. W. Wood ... ... ... .. ... ... | 1 | 1 | 0 |
| Hy. Forsyth ... ... ... ... ... ... | 1 | 0 | 0 |
| W. J. Medlyn ... ... ... ... ... ... | 1 | 0 | 0 |
| Mrs. L. Barnes ... ... ... ... ... ... | 0 | 10 | 0 |
| Miss Ethel Clayton ... ... ... ... ... ... | 0 | 10 | 0 |
| C. T. I. Garner ... ... ... ... ... ... | 0 | 10 | 0 |
| Miss G. Gawthorpe ... ... ... ... ... ... | 0 | 10 | 0 |
| Miss J. Graham ... ... ... ... ... ... | 0 | 10 | 0 |
| Mrs. Potts ... ... ... ... ... ... ... | 0 | 10 | 0 |
| Deaconess Bromley ... ... ... ... ... ... | 0 | 5 | 0 |
| Mrs. Lambert ... ... ... ... ... ... | 0 | 5 | 0 |
| Bank Interest ... ... ... ... ... ... | 1 | 6 | 5 |
| | £1,523 | 9 | 5 |

The Lady Mayoress said it was her pleasure to move the adoption of the Report and Balance Sheet. "I am," she said, "very pleased to have the opportunity of associating myself with this Society, for I feel that it is one that does not quite receive the recognition it deserves. The subject of Geography was, some years back, to most of us something rather dry. It was one of those subjects which never had its right place in our education; it often meant merely an atlas and names, and to most of us in our young days it meant a good deal of dry and dreary work in which we had no interest. During the last few years, however, there has been a great change in our outlook towards it, in our understanding of what it stands for, and I cannot but think that this Society has had something to do with the change in the minds of the general public. It is a subject which teems with human interest, and I think we must look upon it from two points of view: the humanitarian and the understanding we get of different nations. Certainly one of the chief features of the present day is the greater desire to have an understanding of the different countries and peoples, and we can only get that by greater knowledge of them. That is where this Society steps in, in arranging lectures by eminent people possessed of this knowledge, by having a wonderful library—I cannot call it anything else—and your splendid collection of lantern-slides. It cannot help but bring home to many people an understanding of the peoples and life in other countries. In addition to that we, as citizens of Manchester, cannot, or should not, overlook its importance from the commercial point of view. I think that was brought home to me to-day more than I have realised before by a little talk I have had with your Secretary. A city like Manchester—that is, its interests—depends upon its connection with other countries, and unless we have a real scientific knowledge of this subject, not merely the conning over an atlas, but knowledge of the whole resources of other countries, we cannot hope to progress as a commercial city. You are doing a great work by encouraging investigations on these lines, and in travel, so encouraging a greater knowledge. I have, therefore, great pleasure in moving 'That the Report of the Council, and the Balance Sheet for 1923, be and are hereby adopted and approved,' because I think the Society is doing a work which is not perhaps fully appreciated."

Mr. George Ginger formally seconded the proposition, which was carried.

Professor O. T. Jones, M.A., and Mr. Charles Mottram were elected ordinary members of the Society.

The Lady Mayoress having called upon Mr. J. W. Price to move the election of the Officers and Council for 1924-25, the Secretary explained that the list was practically the same as last year, except that Dr. Ree had been made a Vice-President; the Rev. J. Gordon Hayes had removed from Manchester, and they had lost by death Dr. W. Thomson and Mr. R. A. Staniforth. The nominations which had come in additional to the list were those of Professor O. T. Jones and Mr. W. H. Zimmern.

Mr. J. W. Price, in moving the resolution, spoke appreciatively of the work the Council did for the members during the past year. They had had an excellent session, and the Society was to be congratulated.

Mr. J. Howard Hall seconded, and the resolution was adopted. The list is as follows :—

**Patron.**

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Miss L. EDNA WALTER, M.B.E., B.Sc., H.M.
Mr. W. H. ZIMMERN.

Colonel Crook, in his Presidential Address, after thanking the members for the honour conferred upon him in re-electing him to the chair, said the Lady Mayoress had, in her able address, anticipated him on a point upon which he purposed touching—namely, the claim of the Society to greater support from this community. He only hoped that what he had to say might strengthen, if possible, a claim which she had advanced by her kindly appreciation of its work.

We had just been reminded that this was our thirty-ninth Annual Meeting, and we hoped to celebrate, next October, the fourth decade of its existence, by some fitting ceremony. It, therefore, seemed a suitable occasion on which to say something on the position of the Society and its work for the progress of Geography in this district, where the knowledge connoted in that term is of such vital importance to its welfare.

Both from the scientific and educational standpoints and in popular estimation geography has won a more prominent and honourable position than it held at the time of the Society's foundation, and the Society may justly claim to have rendered material aid to that advancement. The year 1884, the year of our foundation, was about the culmination of the age of discovery, and consequently a boom-time for geography. Our founders were enthusiastic in the cause and sought to get for the science that recognition in education, commerce and administration which, as they urged, its importance deserved. The years immediately following seemed to promise early fulfilment of their desires; for the Society had the support of most of the leaders of commerce in the district and was able to give assistance in the establishment at the University of the first Lectureship in Geography.

The cause of geography as a whole did not make so rapid progress as was at that time generally anticipated. True, there poured from the Press a gigantic stream of the literature of travel, of information and instruction, embodying the results to the various sciences of the investigation in the extended field, for the observation of man and Nature, developed by the great explorers. Much was done in co-ordinating and generalising facts and experiences, and some notable works were produced by geographers, but comparatively little increase in the provision made for geographical teaching and study in the schools and Universities. Tardy progress in this regard seems to have been due to difficulties academical and financial—the latter is still with us—and to the lasting controversy as to what was implied by "Geography." It is still often asked, "What is Geography? What is it exactly that you want taught?" Some attempts have been, and some are still being made to set limits to geography. But can we set bounds to a science or study that is synoptic—a general utilisation of every kind of knowledge concerning man and his environment? If definition there must be, he would with diffidence suggest one based on that in the Charter of the Institution of Civil Engineers, where engineering is defined as "the art of directing the great sources of power in Nature for the use and convenience of man," and say of Geography "that it is the practical application of any or all of the more definite sciences to the use and advantage of man in all his relationships, social and economical"

But now that geography is coming into its own it is not necessary to say more of the controversies which delayed recognition of its place in the educational scheme. It is obvious that for the teaching of a subject so comprehensive very high qualifications are required; special powers of mind and balanced judgment with aptitude for sensing those factors, often obscure, which weigh in the solution of the many problems which geography presents.

What we are now striving to do is, in the words of the report, to arouse in this great commercial centre a deeper interest in the provision of the means of instruction, study and research, so that the Chair of Geography, with all its requisite concomitants, may be established at the University. To do this effectively something like £20,000 is required. Under the leadership of Mr. Mellor the Society has started a fund. We feel that if the importance—nay, the necessity—of adequate support to the movement be realised by this community, the required sum will be raised.

The extended knowledge of man and his environment which we possess to-day requires some recasting of old ideas. It is hardly yet fully appreciated how greatly geographical considerations affect the business of the world. The days of special trade with certain localities, enclaves where trade was more or less the monopoly of one or more firms, have passed, or are rapidly passing away as civilised government, in some shape or other, extends its sway over the surface of the earth. In those vast regions where the white races have imposed dominion over less-advanced peoples many intricate problems arise in the conduct of trade and administration; problems which require for their solution the aid of competent geographers. Form of administration and system of policy have to be adapted to the peculiar circumstances of the locality and its inhabitants, and these may not always conform to the interests, or supposed interests, of particular trades. Sound geographical knowledge would in such cases reduce the chances of friction arising from the conflict of views or at least tend towards some harmonious arrangement of the difference.

The infinite variety of geographical and cognate problems with which this kingdom, the great dominions and colonies are concerned are most effectively illustrated in that microcosm of Empire, the great Exhibition at Wembley. No visitor to the British Empire Exhibition, whatever be the level of his intelligence, can view it without bettering his knowledge concerning the lives and interests of the many types of peoples dwelling under the British flag, or of the sometimes extraordinary conditions of their environment.

The enterprise of our forefathers has given us a larger responsibility for the governance and well-being of other races than falls to any other nation. It behoves us to see that nothing be left undone that may make us still more worthy to bear that great responsibility.

Despite some questionable acts in the early history of expansion the British record is an honourable one. It is admitted by competent foreign observers that our nation has a commanding genius for the work of civilisation. Where other nations have succeeded it is largely by the adoption of British methods. Whether this success be due to the fact that the British have had the longest experience in the development of new countries and in the exercise of authority over the widest extent of lands and variety of peoples, or whether it be due to some inherent quality of the race, it is not necessary for the moment to inquire, but in either case the nation has produced a characteristic type of military and civil administrators of unmatched efficiency.

By reason of the world-wide ramifications of its trade interests no part of our country is more deeply concerned than is Lancashire that there should be forthcoming in sufficient number the type of man qualified to carry on the administrative services of the Empire or competent to conduct that kind of research which leads to the practical application of the advances made in the various branches of science. Before the war fears were sometimes expressed that, unless effort were made to avert it, there would be a dearth in the supply of men of the standard of character and ability required. Of the younger members of this class or type, which by its instincts, traditions and associations naturally took up arms at the first call, the Great War has taken particularly heavy toll. There is, therefore, some leeway to be made up as well as increased provision for the education and training of the larger numbers required in the service of our rapidly developing Empire and in the exploration of its resources. There is urgent necessity, then, for the better equipment and endowment of the geographical department of our University in order to strengthen that form of education which will fit the rising generation for its task in upholding the credit of the British name in governance and trade and give that fuller knowledge so essential in the consideration of the many problems of Empire which now confront us.

The Lady Mayoress also referred to our work as a Society. Of course, our province is somewhat different from that of the University. We can do a great deal in popularising geography, in keeping up that public interest and spirit which among other things, may help to the success of the University. We have had, and often have still, great travellers coming to tell us their experiences, and our papers bring before our audiences many diverse problems—physical, economical and ethnological; they also bring us face to face with many of the leaders of expeditions to remote parts, or those engaged in other lands. There is great advantage in meeting those who have been in actual contact with these problems. We are now engaged in helping, so far as we can, Regional Survey, the enterprise which has lately been set on foot in Manchester. In that respect, no doubt, the Society can render valuable assistance in the advancement of the study of local geography and all that is connected therewith.

Mr. E. Swithenbank, J.P., moved: "That the best thanks of the Society be tendered to Mr. John Thomason, A.C.A., for his services as Hon. Auditor for the past year, and that he be hereby re-elected." Mr. Swithenbank said he could sympathise with Mr. Thomason when he got to the end of all his labours and found that there was an adverse balance, but he hoped Mr. Thomason would undertake the work again and would, at the end of next year, find a balance on the right side. The President had said the work of the Society differed, perhaps somewhat considerably, from that of the University, but he had hoped that the President would have touched upon the connection between the two. While all of them appreciated the great advantage there was in coming into personal contact with travellers, explorers and geographers in the wider sense, some of them felt there was some principle underlying Geography which might have received their attention. He must compliment the President and the Hon. Secretary (Mr. Barker) upon the great efforts they had just put forth to advance the study circle, from which great benefit had been received. Mr. Barker had brought his interest to bear upon it, and secured people to address the circle and give them a glimpse of real, scientific geography. He hoped they would succeed as well as they had in the past, and have a still greater attendance.

Mr. T. Gregory, J.P., seconded, and the resolution was accepted.

Mr. F. B. Osborne, M.A., next moved: "That the best thanks of this meeting be tendered to the Lady Mayoress for presiding, and to the Right Hon. the Lord Mayor for kindly granting the use of his Parlour." Mr. Osborne said it was the first time in the 39 years' history of the Society that they had not only a Lady Mayoress taking the chair, but remaining until the end of the meeting. He had heard a good many addresses by Lord Mayors in his time, but he did not think that any had touched him as being so sympathetic as that of the Lady Mayoress. She had shown a sincere desire to help the Society and a great knowledge of what was needed by study; she not only saw how the outlook had been changed, but also how little the services rendered by the Society were appreciated in Manchester. It seemed a disgrace that in such a centre they could muster a membership of only 638. He, personally, would not be satisfied until their membership was 1,000 or 2,000. It was on a knowledge of geography and of the industries in different parts of the world that the commercial part of the city depended. The Society was doing its best to harmonise its work with that of the University. "We have," said Mr. Osborne, "succeeded in getting geography made part of the curriculum in the schools." It enhanced its position when it had as one of its secretaries a lecturer at the University. But without many subscriptions they could not adequately carry on their task. He hoped that in this fortieth year of their existence they would add greatly to their membership.

The President, associating himself with the remarks of Mr. Osborne about the Lady Mayoress, said that in his address he forgot the point raised by Mr. Swithenbank—the study circle, in which they were trying to work with the University in the technical part of geography. Mr. Swithenbank had explained its value, and they knew how much had been done in that direction. As regarded the extension of their membership, the President said he certainly felt that Manchester people might go in greater numbers to the Society, because they had a wonderful library and collection of maps. But they had no map-room, no place where geographical study which required maps could be carried on. That was one of their requirements.

The resolution having been carried with acclamation, the Lady Mayoress said she felt that the thanks of the meeting should be given to the permanent Officials and the Members of the Committee, who did a great deal of very hard and tedious work during the year. She had had no desire to leave the meeting, because it had given her pleasure to hear the speakers, and she had really enjoyed the afternoon.

The proceedings then terminated.

## ORDINARY MEETINGS, 1924.

| 1924. | Lecturer. | Subject. | Chairman. |
|---|---|---|---|
| Jan. 8. | Prof. Em. de Martonne. | A Geographical Study of Transylvania. | Col. Hy. T. Crook, V.D., D.L. |
| ,, 15. | Chas. W. Smith, B.A., F.R.G.S. | Some Cities of Provence and the Paris Basin. | do. |
| ,, 22. | W. H. Barker, B.Sc., F.R.G.S. | Recent Developments in the Barbary States and the position of Tangiers. | do. |
| ,, 25. | Ll. Rodwell Jones. | The Location of the British Settlements in North America at the end of the 17th Century. | do. |
| ,, 29. | Rev. Walter Weston, M.A., F.R.G.S. | Nature and Man in the Land of the Rising Sun. | do. |
| Feb. 5. | J. M. Wordie, M.A. | Jan Mayen Island and the East Greenland Ice Current. | do. |
| ,, 12. | Rev. Alexander Taylor, M.A. | The Eastern Barrier of France. | do. |
| ,, 19. | Harold Feber, B.Sc., F.R.G.S. | Up the Nile to Assouan, with a peep at the Luxor Tombs. | do. |
| ,, 26. | J. W. Price, F.R.G.S. | Life and Scenes in India. | Joseph Berry. |
| ,, 29. | Prof. W. J. Fleure, D.Sc. | A Study of the Boundary Line between the more Roman and less Roman parts of France. | Col. Hy. T. Crook, V.D., D.L. |
| Mar. 4. | Charles Sutton. | Venice: Past and Present. | do. |
| ,, 11. | C. Sutcliffe Wood. | With the Manchesters in Egypt and Sinai. | do. |
| ,, 14. | Prof. O. T. Jones, M.A., D.Sc. | The Origin of the Manchester Plain. | do. |
| ,, 18. | Ewin Pickstone. | Three and a Bean: A Holiday Tour. | do. |
| ,, 25. | Wilfrid Mark Webb, F.L.S. | Nature Reserves in this and other Countries. | do. |
| Oct. 14. | — | Fortieth Anniversary Meeting. | |
| ,, 21. | Oliver Brockbank, M.A. | The Wilderness of the Wanderings. | W. H. Barker, B.Sc., F.R.G.S. |
| ,, 24. | R. W. James, M.A., B.Sc. | The Geographical Importance of Antarctica | Col. Hy. T. Crook, V.D., D.L. |
| ,, 28. | Prof. G. Lenn. | Vegetation of the Alpine Region of Java. | do. |
| Nov. 4. | Rev. H. Allen Job. | Pioneering in Peru. | do. |
| ,, 11. | Edgar Morton, M.Sc. | The Geological Interpretation of Scenery. | do. |
| ,, 18. | Capt. J. J. Bailey, F.R.G.S. | Within the Arctic Circle. | do. |
| ,, 21. | W. B. Wright, M.A., M.I.M.E. | Floating Continents. | do. |
| ,, 25. | Rev. J. H. Burkitt. | Ruined Abbeys of the North. | do. |
| Dec. 2. | J. Oliver Holdsworth. | The Austrian Tyrol in 1922. | Geo. Ginger, F.R.G.S. |
| ,, 9. | Rev. Alexander Taylor, M.A. | The Balearic Islands. | Col. Hy. T. Crook, V.D., D.L. |
| ,, 16. | Albert N. Wilmore. | Barbados: A Corner of Oldest Empire. | do. |

## STUDY CIRCLE MEETINGS, 1924.

| | | |
|---|---|---|
| Jan. 15. | Miss I. H. Seed, B.Sc. | Czecho Slovakia. |
| ,, 29. | F. H. King, B.A. | The Distribution of Population round the Mersey and Dee Estuaries in its Sociological Aspects. |
| Feb. 12. | Miss K. E. Basford, B.A. | Maps of the early 16th Century in relation to the discovery of America. |
| ,, 26. | W. Fitzgerald, B.A. | The Relationship of the Midhe (Meath) Kingdom to Roman Britain. |
| Mar. 11. | A. V. Williamson, B.A. | Irrigation in the Indo-Gangetic Plain. |
| Oct. 21. | Miss E. Simkins, B.A. | The Agriculture of the Deccan Plateau of India, and its influence on the Distribution of Population. |
| Nov. 4. | H. Thomas, M.A. | Heavy Chemical Industry, with special reference to its Development in Lancashire. |
| Dec. 2. | H. W. Ogden, B.Sc | Cheshire Villages and Some Causes affecting their Location |

# Reviews.

"With my Wife across Africa." By Colonel J. C. B. STATHAM, C.M.G., C.M.E. London : Simpkin, Marshall, Hamilton, Kent and Co., Ltd. pp. 324, 3 Maps, 55 Illustrations. 12/6.

The route chosen by the author, in his attempt to cross Africa, was from Mossamedes to the Kubango River, down it and the Zambesi River system to the Indian Ocean. This route had the advantage of comparative healthiness in the western portion, where it crossed high plateaux. The hotter and more unhealthy plains to the east would not be reached until the driest and coldest periods of the year. Again, the route had the further advantage of the possibility of transport by canoe.

Apart from a well-written and interesting account of travel, the book provides a valuable addition to geographical, ethnological and physiographical research. The problem of dessication is dealt with, especially that of the Kalahari region. In the author's opinion, a period of dessication is proceeding there at the present. It once was a vast sea which has been silted up, though evidence abounds that immense periods of dessication were followed by wet cycles.

Geographical evidence proves that a large number of river beds, which probably had flowing water within the last hundred years, are now dry. Historical evidence, derived mainly from the natives though not thoroughly trustworthy, yet impressed the author, in his journeys, that the peoples whom he encountered were convinced of the increasing dryness of the country. Less rainfall, less water, was the statement of the Bushmen, who are singularly truthful and observant. It was the tradition also of the Bantus, handed down from generation to generation. The migrations of this race—its grouping and distribution, manners and customs, are not the least important part of the book, enhanced as it is by three sketch maps, fifty-five illustrations. Yet withal a general index would prove a boon to the reader.

K. Q.

"The Principles of Economic Geography." R. N. RUDMOSE BROWN, D.Sc. London : Sir Isaac Pitman and Sons, 1922. pp. 208. 7/6.

"Economic Geography." J. MCFARLANE, M.A., M.Com. London : Sir Isaac Pitman and Sons, Ltd., 1923. pp. 568. 10/6.

"Commercial Geography." EDWARD VAN DYKE ROBINSON. Chicago : Rand McNally and Company, 1923. pp. 466, xlix. $2.00.

"The Principles of Economic Geography" is a volume following the old school. It opens with a statement of certain "geographic principles," and then proceeds to devote a series of chapters to different groups of commodities and industries, etc. In this instance the general principles are stated with a brevity which is liable to leave the reader doubtful as to the validity of some of the deductions. There are no illustrations. The chapters on the commercial commodities read like a gazetteer, and share in common with a gazetteer, a value as a useful reference source, but facts presented in this manner are of limited use and difficult to assimilate.

The volume entitled " Economic Geography," attempts to give a " regional presentation " of the subject after the later school. The book, again, is only in outline, but here the outline is of the same nature as the first strokes of a picture—which a novice can recognise, and the artist can complete. The method employed is essentially rational and logical, and has the further advantages that it is particularly suited to this branch of geography, in that it does not mask political divisions, and in that it stresses the fundamental condition for trade, viz., that geographic differences are in general of some significance than similarities. The reader is thus left with a more balanced and accurate knowledge of wider application. This is an excellent book upon which to base more advanced studies.

" Commercial Geography " is distinct from either of the publications mentioned. As its title implies, the commercial aspect is emphasised, yet some historical matter is introduced to give a desirable perspective, and geographic facts are balanced by references to other facts which belong strictly to the realm of economics. There are many good illustrations. The presentation is an interesting blend of the two methods referred to above. Some areas are treated on a regional basis, in others the gazetteer tendency obtrudes itself : but in spite of this compromise the volume should prove a useful and suggestive elementary textbook suitable for the study of the more commercial aspect of general economic geography.

" The Races of Man." A. C. HADDON, Sc.D., F.R.S. Cambridge University Press, 1924. pp. 156. 6/-.

In 156 pages Dr. Haddon has summarised the essential characteristic features of the different races of Africa, Europe, Asia, Oceania and America. The particular physical peculiarities selected in order to distinguish different racial types are those associated with the hair, skin, stature, form of head, facial peculiarities, nose and eyes. In each group of countries the topographical and climatic conditions are discussed in relation to their influence on the development and on the migrations of peoples.

The evidence from Prehistory is extensively utilised to determine the probable causes of particular affinities which exist to-day between the different races. In a concluding summary the view is stated that man originally evolved " somewhere in Asia." This summary gives a very valuable resumé of modern views on the question of human evolution.

The vast wealth of information collected in so small a compass leaves one with the hope that the promised larger work will be issued in the near future. There is a useful short bibliography at the end of the book. L. S. P.

" Geography Teaching." British Association Reprints, 1923. pp. 24. 1/-.

" School Geography." E. J. G. BRADFORD, M.Sc. London : Ernest Benn, Ltd., 1925. pp. 104. 7/6.

The small pamphlet issued by the British Association is admirable in its clear definition of the field of geographical study and the principles which should underly the school syllabus in the subject.

" School geography must be the geography of geographers : not the mere learning of geographical data and results, but a training in the geographer's characteristic methods and principles of interpretation and an assimilation of his characteristic point of view. Only when a subject is taught in this way are the items of knowledge communicated given their true relations and significance so that the subject as a whole makes its special contribution to the pupil's outlook and habits of thought."

It is with a sense of disappointment that this statement from the Geographical and Educational Sections of the British Association should be followed by a publication which expresses and elaborates the idea that " the function of geography in the school curriculum may be regarded as being above all others (1) the unifying subject in the curriculum, and (2) the medium for presenting those points of contact between school studies and actual life which can be most easily and naturally developed." The author has apparently so little acquaintance with the geography of geographers that his work as " a critical survey of the present-day teaching methods " has little value, and as a guide to improved teaching is extremely misleading.

W. H. B.

" The Mediterranean Lands : an introductory study in human and historical geography." M. I. NEWBIGIN, D.Sc. London : Christopher's, 1924. pp. 222. Sketch maps. 5/6.

" The Mediterranean." O. J. R. HOWARTH, O.B.E., M.A. Oxford : Clarendon Press, 1924. pp. 175. Illustrations and maps. 2/6.

The Mediterranean lands have so special a place in the development of Western civilization that students in many fields of study will welcome these two books. The larger work gives in bold and yet graceful outline the adjustment during different epochs of conditions of life and economic activities to the peculiar natural conditions of the region. The smaller book is an excellent textbook for schools dealing more specifically with the geography of the Mediterranean.

W. H. B.

" By Camel and Car to the Peacock Throne." E. ALEXANDER POWELL. London : John Long Ltd., 1923. pp. 392. Map and illustrations. 15/- net.

"Casual Wanderings in Ecuador." BLAIR NILES. London: John Long, Ltd., 1923. pp. 249. Illustrated. 12/6 net.

Travellers' tales are largely impressionist, and therein lies both their value and their insufficiency. Major Powell, an American officer whom the war brought into intimate relations with both British and French officials, carries the reader with him across the arid Hamad from Damascus to Baghdad, and by the steep and winding road over the Zagros ranges via Kermanshah and Hamadan to Tehran. Here and there he stays his travel narrative to discourse on Zionism and its relation to the Arab question or to comment on British rule in 'Iraq, with the *pros,* from King Hussein's viewpoint, and the *cons,* from the 'Iraq inhabitants viewpoint, of the sovereignty of King Feisal.

To turn to the high plains of Ecuador and contemplate the high snow-capped crown of Chimborazo is to see another world. Shades of the Spanish conquerors mingle with those of the peaceable Incas whom they conquered, whilst in the streets of Guayaquil, Riobamba and Quito may be seen the leisured, if somewhat sordid, life of the Indian and half-breed population of to-day. From the port of Guayaquil up, up, up the mountain railway (the "G. and Q.") to Riobamba and Quito we gather impressions—nothing more and nothing less. W. H. B.

"Evolution of the Maps of the British Isles." Sir HERBERT GEORGE FORDHAM. Manchester University Press, 1923. pp. 20. 1/- net.

"The Road-Books and Itineraries of Great Britain, 1570 to 1850." Sir HERBERT GEORGE FORDHAM. Cambridge University Press, 1924. pp. xv. and 72. 7/6 net.

"John Cary—a Bibliography, with an Introduction and Biographical Notes. Sir GEORGE FORDHAM. Cambridge University Press, 1925. pp. xxxiv and 139. 10/6.

R. L. S. remarked, "I am told there are people who do not care for maps, and I find it hard to believe." But though the map habit is now fairly general, few know the history of that development which has made the modern British map a thing of beauty and utility. Primarily bibliographical in character, the above works present in their extended introductions, the circumstances which called forth map production and determined the nature of the work. Sir George Fordham almost stands alone in the study of carto-bibliography—a term suggestive of a dry-as-dust subject strangely at variance with the romance and lure of the map which he weaves into the introductions. The post-roads, health resorts, spas, and fairs; later canals, railways and roads form a background to the science and art of map making as it developed not only in Britain but on the Continent.

"John Cary" gives a new orientation to the author's voluminous carto-bibliographical studies and one which will be much appreciated by students of the history of cartography. Cary may well be regarded as the most prominent and successful exponent of English cartography. He was, moreover, personally associated as a cartographer with three important movements of a national character—canal construction, the development of rapid stage-coach and post-chaise traffic, and by his association with William Smith, in the preparation, engraving and publication of our first geological survey. All will agree with Sir George Fordham when he urges that this publication should not stand alone. It might well be one of several volumes dedicated to the study of the cartographical art as developed in England from the time of Elizabeth to our own day. W. H. B.

## CAPTAIN SCOTT'S SCIENTIFIC REPORTS.

"The Physiography of the Ross Archipelago." F. Debenham, O.B.E., M.A. (Cantab.), B.Sc. (Sydney), Fellow of Gonville and Caius College, Geologist to Scott's last expedition. pp. xiii+40. Maps and Illustrations. 5/-.

"Physiography of the Beardmore Region." C. S. Wright, O.B.E., B.A. (Cantab.), M.A. (Toronto), F.R.A.S., Physicist to Scott's last expedition. pp. vii+25. Numerous Illustrations and Maps. 5/-.

"Physiography (Robertson Bay and Terra Nova Bay Regions)." R. E. Priestley, M.A. (Cantab.), Fellow of Clare College, Cambridge, Geologist to the Expedition. pp. x+87. Maps and Illustrations. 7/6.

"Report on the Maps and Surveys." British Antarctic Expedition. F. Debenham. pp. viii+94. Maps and Illustrations. 10/-.

"Meteorology." Three vols. G. C. Simpson, D.Sc., F.R.S., Director of the Meteorological Office, Meteorologist to Scott's last expedition. Vol. I, pp. xi+326; Diagrams. Vol. II, pp. 138; Weather Maps and Pressure Curves. Vol. III, pp. xi+835; Tables.

"Miscellaneous Data." Compiled by Colonel H. G. Lyons, F.R.S. pp. 75. Plan. 5/-.

These eight volumes form an important part of the scientific memoirs of the British (Terra Nova) Antarctic Expedition, other numbers of which were reviewed in the last volume of this Journal. The greatest and most enduring merit of this expedition consisted, not in the attainment of the South Pole, but in the attention devoted to the advancement of science. The polar journey contributed, indeed, to this desirable end; the discoveries made during its progress, however, form but a small part of the scientific achievements of the expedition as a whole, which exceeded those of any previous expedition to either of the Poles. The results of this expedition have been written up better than those of any other expedition, because the tragedy opened the popular purse. We reap the benefit of this ample publication, although we may breathe a regret that such wealth of material was not harvested from fields previously untrodden, instead of from those that were already the best cultivated in Antarctica. The mountain coasts, which Scott alone knew, are not the predominant form of Antarctic seaboard; whereas the ice-cliff coasts, which are the principal, and the distinctive, characteristic of the coastline, were never visited by any of his parties. The obvious result of this is that conclusions based on the data collected solely on the mountain seaboards are liable to be profoundly modified in the future.

We are no less thankful, however, to the experts responsible for the volumes before us, who are in no need of any introduction. The three physiographical reports are technical works. Their writers have, perhaps, a tendency to become absorbed in topographical details, but they have dealt with their subjects, needless to say, in a most able manner. Each writer considers the natural processes by which the land assumed its present varying forms.

Mr. Debenham has given us the best description we possess of the physiographical features of the Ross Archipelago and its connections with the Ross Barrier and the continental mainland. The whole archipelago is volcanic, and the contrast between its island forms and the eroded mountains of sedimentary rocks, which are its main, and neighbouring, boundary to the west, is probably unique. Ross Island is a submarine mountain, independent of the mainland. Mt. Erebus differs from the other volcanoes in having passed through " at least three periods of catastrophic violence." The others have been built up by " continual but moderate issuing of lavas and tuffs," and by the growth of minor craters. Good detailed descriptions are given of all the parts of the archipelago visited, and special attention is devoted to " the higher levels of Mt. Erebus," which is still active and which Mr. Debenham ascended in 1912. He believes that the volcanoes " are sporadic over the district," but that they are " clustered radially around Mts. Erebus and Discovery." The covering of ice hides any evidence that may exist of erosion and deposition, but these islands are probably no older than early Tertiary times.

The Beardmore Glacier was discovered by Sir Ernest Shackleton in 1908, and ascended by Mr. Wright, in Captain Scott's company, in 1911. It is the largest valley glacier in the world, being over a hundred miles long and from eight to twenty-five miles in width, but its rocks have been examined in only four places. From the Ross Barrier, into which it discharges, as far as the Cloudmaker Mountain, its walls are mostly snow-covered, but they consist of " foundation metamorphic rocks including younger granites." The mountains on each side of the upper portion of the glacier are " horizontally-bedded sediments (Beacon Sandstone) and dolerite intrusions." The general topography is essentially glacial, but there are few valley glaciers, the ice pouring down the slopes, for the most part, in huge ice-falls. More bare rock is exposed in the upper, than in the lower, part of the glacier. Mr. Wright obtained no evidence of erosion by water and no decisive evidence as to " the relative efficiency of the sculpturing agencies by which valley glaciers may be initiated." He believes that the main drainage of the region to the eastward of the glacier flows southward to the Ross Barrier, and so away from the Beardmore, which may occupy a fault plane.

Mr. Priestley's book consists of two separate parts, dealing with the beautiful Robertson Bay and the " inexpressible " Terra Nova Bay districts, both of which he explored. The dominating feature of the former of these areas is the mighty Admiralty Range, of perfect Alpine form, which stands in strong contrast to the second great natural object there, the Cape Adare Peninsula across the bay. This peninsular is between 20 and 30 miles in length and about 3,000 feet high, many miles of its eastern cliffs rising sheer to this height from the Ross Sea. It is a narrow finger of basalt lava, and is one of the few examples in Antarctica of severe marine erosion. The Ridley Beach at the northern end of it is the only shingle beach known in Antarctica, and has along " a considerable length of the cliff " a terrace 50 feet high, the origin of which is doubtful. The southern portion of Robertson Bay has four principal glaciers separated by steeply-sloping mountain ridges. All but one are valley glaciers, two of them have lateral moraines, and two have formed a small ice shelf on the coast, with vertical cliffs from 30 to 50 feet high. The west coast of Robertson Bay is a distinct physiographical unit, dominated by the massive block of the Admiralty Range, in which Mts. Sabine, Minto and Adam each attain about 10,000 feet in height. The land forms have been almost entirely sculptured by ice. " The stream erosion of the region was never very prominent." The coast consists of the " alternation of rock bluffs and glacier cliffs," behind which rise the snow mountains, forming magnificent views.

The main interest in the Terra Nova Bay area arises from its position between the tabular mountains, capped by the Beacon Sandstone, to the south, and the volcanic Admiralty Range to the north. The principal features of this little area, however, are glaciological. A central plain of level confluent ice is nearly surrounded, except in the south, by heavily-glacierised mountains. The southern end of this plain is formed by the base of the Drygalski Ice Tongue. Evans' Coves, where Scott's Northern Party passed their troglodytic existence, are situated on its south-east border. The Campbell and Priestley Glaciers are large effluents for the Highland Ice which lies to the west of Mt. Melbourne, and occupy deeply-cut channels down to the confluent ice. Above the foreshore at Evans' Coves is a recent raised beach, but the coastline northwards to Cape Adare is volcanic, and has been profoundly modified by marine erosion. Glacierisation is conservative in effect, as the ice protects the coasts from the invasion of the sea. From this it follows that Antarctica, as a whole, possesses the oldest coastlines in the world. Beautiful photographs illustrate these volumes.

We are peculiarly indebted to Mr. Debenham for his Report on the Maps and Surveys. The cartographical work of this expedition may be said to have been carried out in three departments, those of the ship, the Main Base, and other parties. Each of these suffered from certain disadvantages, in addition to the special difficulties of surveying in polar regions. The first of these, which was common to each branch of the survey, appears to have been defective organisation. No definite plan was drawn up for the conduct of the work as a whole, and the result has been that comparatively little new cartographical work of value remains. This is partly due to the war. Lieutenants Rennick and Pennell ably carried out the ship's survey, but both of them fell, unfortunately, before their results were worked out. Captain Evans, the Second in Command of the expedition, was in charge of the surveying from the Main Base, but he had no staff, and was called upon for so much other work that this part of the survey suffered. Some of the best charting was done on the sledge journeys, especially by the Northern and Western Parties.

Mr. Debenham has carried out with his customary ability the difficult task of reporting on all this. He gives a detailed description of the instruments used, and discusses the observations taken for fixing the fundamental position of Cape Evans. A chapter is devoted to the "Surveys close to Headquarters," and another to the southern Journey. Full particulars are given of the splendid series of polar observations, which are compared with those taken by Amundsen. A valuable description of the expedition's maps is given, with a number of notes, illustrated by sketches, conveying much useful information not accessible elsewhere. Special mention should be made of Mr. Debenham's description of Oates Land. Each of the large series of maps is well drawn; they are the best we possess of Antarctica.

The first volume of Dr. Simpson's great work consists of his "Discussion" on Antarctic Meteorology. His second volume comprises all the weather maps and pressure curves; and the third volume contains all the meteorological registers kept at the stations and on journeys, with tables, etc. This book is a milestone on the road of progress in the study of atmospheric phenomena. Its author was the first trained meteorologist to visit Antarctica, and these volumes are a monument both to his industry and to his ability. Their contents are, for the most part, of a technical character; but we may glance at the branches of the subject dealt with and note one or two features of more general interest.

The frontispiece is a novelty of educational value. A transparent sketch map of Western Europe is superimposed upon a coloured map of the Ross Dependency, to the same scale. The main geographical features of the Ross Sea area and the positions of the meteorological stations are first described, with a survey of how the material to be dealt with in the book was collected, on journeys by land and sea as well as at the stations. A general account of the weather, not only at Cape Evans and Cape Adare, Scott's stations, but also at the Norwegian station on the Bay of Whales, is then given. Temperature, wind, cloud, precipitation and pressure are exhaustively treated, with descriptions of the instruments used for the observations. Dr. Simpson shows that the rise of temperature which accompanies southern blizzards is not due to a Fohn effect as our explorers had imagined. The Antarctic air-circulation is from the inland plateau radially towards the ocean, the supply being kept up by high level currents towards the south. The descending air is warmed up dynamically.

Dr. Simpson deals mainly, of course, with the meteorological conditions in McMurdo Sound, but he also gives attention to the conditions at Cape Adare, on the polar journey, etc. He has made careful determinations of the height of the Polar Plateau, from Captain Scott's aneroid observations, supplemented by those of other parties. The highest point, in latitude 88° 30′ S., is 9,862 feet above sea level, and the South Pole comes out at 9,072 feet. Dr. Mohn's determination from Amundsen's readings is 8,051 feet, with a possible plus or minus error of 196 metres (637 feet). Dr. Simpson's result is correct to within 200 feet, so that the actual difference between the two results is not as great as it at first appears.

There are chapters on the upper air currents, atmospheric electricity, and " Pressure, Winds and Weather." The whole subject is treated in a masterly manner; some previous theories are shown to be erroneous and new theories are advanced. The tables include the splendid meteorological registers kept by Lieut. Bowers on the fatal journey and on the winter journey to Cape Crozier, also all other observations taken during the course of the expedition and the Norwegian record at Framheim.

" Miscellaneous Data " completes the series and contains the following information : A list of scientific reports, notebooks and original documents; a description of the Terra Nova and all equipment and stores; some notes on the dog, pony and mule transport and on the tidal observations. Some of this matter will probably be of value to a future expedition, and its publication exemplifies the thorough manner in which the work of Scott's last expedition has been written up. J. G. H.

" The Social and Political Systems of Central Polynesia." By R. W. WILLIAMSON. Cambridge University Press, 1924. Vol. I, pp. xxx+438; Vol. II, pp. 496; Vol. III, pp. 487. Maps. 72/-.

THE author defines Central Polynesia, for the purpose of his inquiry, as the groups of islands nearest the Equator. He thus excludes Hawai'i to the north and New Zealand to the south. Easter Island is included but the Fijian and other islands of the west are included only in so far as they have Polynesian elements tending to illustrate or explain Polynesian systems and customs.

In these three volumes the author has attempted to sift, arrange and co-ordinate the vast amount of ethnographical material which has been accumulated in the past by travellers, explorers, missionaries, Government officials, and others. The result is a monumental work, serving not merely as a compendium of ethnographical knowledge of this much investigated, though out-of-the-world region, but of a reasoned account of the social and political systems in these scattered groups of islands. But Mr. Williamson has by no means been content to present the statements and views of others. He has his own contribution to make, especially with regard to the position of the chief or head of the social group.

Though this work is devoted to Polynesia as it was and not as it is, and therefore makes its greatest appeal to the student of ethnology and anthropology, yet nevertheless it has great value to the student of geography. Here, no less than in other parts of the world occupied by peoples whose cultures have seemed strange and primitive to the European, the forces springing from economic development are producing changes of a destructive no less than of a constructive character. The old social and political systems are liable to be shattered in the readjustment of native life to modern conditions. The economic development for copra, sugar, fruits and phosphates and the new orientation of the world towards the Pacific Ocean now in progress are but phases of a new life being born in these Southern Seas. The changes require for their full appreciation a background such as Mr. Williamson's work provides. W. H. B.

"The Natural Wealth of Britain." By S. J. DULY. Hodder and Stoughton, 1919. pp. 319. 6/-.

THE book is one of the New Teaching Series of Practical Text-books. The author claims for the work "a coherent argument that geology takes the basic place among the studies which help to explain the development of civilisation and the localisation of the industrial arts." What the author really does is to give a simple account of elementary geology in relation to certain activities of man, especially in Great Britain.

"The Rainfall of the British Isles." By M. DE CARLE S. SALTER. University of London Press, 1921. pp. 295.

THE object of this book is to bring together some of the general conclusions which the prolonged investigation of British weather has given. Twenty-four years of active participation in the work of the British Rainfall Organisation gave the author unique opportunities for summarising the results of many years of labour in compiling and studying statistics of rainfall. The book has taken its place as one of the indispensable works for the study of the British Isles.

# List of Maps, Books, etc.,

ACQUIRED BY THE SOCIETY.
FROM JANUARY 1st 1923, TO DECEMBER 31st, 1924.

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## Maps.

### EUROPE.

Ordnance Survey Map of Roman Britain. Scale, 16 miles to 1 inch. Southampton : 1924. *The Secretary.

The Geographia Plan of Manchester. By Alexander Gross, F.R.G.S. Scale, 5 inches to 1 mile. London : 1922.

Plan of Liverpool. By John Bartholomew, F.R.G.S. Scale, 300 yards to 1 inch. Index. Edinburgh. *The Secretary.

Bartholomew's 4 Miles to the Inch Road Map of England and Wales. Sheet 3, Yorkshire. Edinburgh. *Mr. J. E. Balmer, F.R.G.S.

Plan of Hull. Scale, 850 feet to 1 inch. Index. Hull. *The Secretary.

Scotland. By John Ainslie. Scale, 15 miles to 1 inch. *Mr. Harold Webster.

Bacon's War Map of Europe. Scale, 63 miles to 1 inch. London. *Mr. J. E. Balmer, F.R.G.S.

Carte Internationale du Monde au 1/1.000,000. N.P. 33. Gävle. *Norges Geografiske Opmaaling.

Norges Geografiske Opmälings. Virksomhet Gjennem, 150 AR. 1773-1923. Utgitt av Norges Geografiske Opmäling. Maps. Illustrations. Kristiania : Grondahl and Sons, 1923. *Norges Geografiske Opmäling.

Beretning om Norges Geografiske Opmaalings Virksomhet, 1 Tidsrummet, 1 Juli, 1921—30 Juni, 1922; 1 Juli, 1922—31 Desember, 1923. Kristiania : 1923 and 1924. *Norges Geografiske Opmaaling.

Norges Topografiske Beskrivelse. Gradavdelingskarten. Hefte 2, N10 Skjomen. Hefte 3, M11 Hellemobotn. Hefte 4, L10 Hamaroy. Hefte 5. L11 Nordfold. Utgitt av Norges Geografiske Opmaaling. Kristiania : 1922 and 1923. *Norges Geografiske Opmaaling.

Oversiktskart i 1/2,800,000 over Gradavdelingskarter og Rektangelkarter i 1/100,000. Oversiktskart i 1/5,300,000 over Amtskarter (Fylkeskarter) og Generalkarter. Kristiana : Norges Geografiske Opmaaling, 1923 and 1924. *Norges Geografiske Opmaaling.

Geistlig Inndelingskart over Nord Norge. Hälogaland Bispedömme. Maalestok, 1/1,000.000. Kristiania : Norges Geografiske Opmaaling, 1922. *Norges Geografiske Opmaaling.

Geistlig Inndelingskart over Lör Norge. Oslo, Hamar. Agder, Björgvin, Nidaros, Bispedömmer. Maalestok, 1/1,000.000. Kristiania : Norges Geografiske Opmaaling, 1922. *Norges Geografiske Opmaaling.

Norway. Topografisk Kart over Kongeriket Norge. 1/100,000. Rektangel 22B, Haus; 37B, Atnasjo; 50B, Verdal, Gradavdeling; N7, Tranöy; L12.

Sörfold; L14, Junkerdalen; E33, Tunhovd; U18, Lavvooaivre; X5, Rastigaissa; Æ6, Svanvik. Kristiania: Norges Geografiske Opmaaling, 1922-1923. *Norges Geografiske Opmaaling.

Landgeneralkart over Norge. Mooleslok, 1/250,000. Blad XXI. Salta. Kristiania: Norges Geografiske Opmaaling. *Norges Geografiske Opmaaling.

Norges Geologiske Undersökelse. Geologisk Oversiktskart over Kristiania-feltat. Mälestokk, 1/250,000. Kristiania: Norges Geografiske Opmaaling, 1923. *Norges Geografiske Opmaaling.

Norges Geologiske Undersökelse. 1/100,000. Sheet Gran. Kristiania: Norges Geografiske Opmaaling, 1923. *Norges Geografiske Opmaaling.

## ASIA.

Chinese Turkestan and Kansu. From surveys made during the explorations of Sir Aurel Stein, K.C.I.E., 1900-01, 1906-08, 1913-15. Index Map. Scale, 1/3.000.000.

Map. Scale, 1/500,000. Sheet 1, Turug-Art, Terek-Dawan; 2, Kashgar, Muztagh-Ata; 3, Sarikol; 4, Yai-Döbe; 5, Yangi-Hissar, Yarkand; 6, Karghalik, Kilian; 7, Ak-Su, Uch-Turfan, Kelpin; 8,; Maral-Bashi; 9, Khotan, Sanju; 10, Kara-Koram, Khitai-Dawan; 11, Muz-Art; 12, Kara-Yulghun, Bai; 13, Mazar-Tagh, Kara-Dong; 14, Sampula, Chira, Keriya; 15, Yurung--Kash and Keriya R. Sources; 16, Kere-Bazar, Bai; 17, Kucha; 18, Keriya River End; 19, Niya; 20, Kara-Dawan, Kara Shahr River; 21, Bungur, Korla; 22, Charchan; 23, Kapa, Achchan; 24, Kara-Shahr; 25, Konche-Darya; 26, Vash-Shahri; 27, Khadalik; 28, Turfan; 29, Singer, Lou-Lan; 30, Lop-Nor; 31, Pichan, Chik-Tam; 32, Ancient Lop Lake Bed; 33, Lowaza, Bash-Kurghan; 34, Barkul, Hami; 35, Su-Lo-Ho Delta; 36, Khanambal or Anambar; 37, Karlik-Tagh; 38, Tun-Huang, An-Hsi; 39, Nan-Hu; 40, Yū-Men-Hsien; 41, Ch'ang-Ma; 42, Chin-T'a; 43, Su-Chou; 44, 45, Etsingol, Etsin-Gol Delta; 46, Kan-Chou; 47, Kungurche.

Triangulation Charts, Survey of India. Nos. 42IM, 42KJNO, 51LP and 52IM, 60DH and 61AE, 60KLOP, 69CDGH, 69JKNO, 75ABEF.

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Sectional Drawing of Levelled Line, Kum-Kunduk to Besh-Tograk.

Dehra Dun. Trigonometrical Survey Office. 1923. (To accompany Records of the Survey of India. Vol. XVII.). *The Superintendent, Trigonometrical Survey.

Persia and Afghanistan. Scale, 1/4.055,040. T.S., G.S. No. 2149. London: War Office, 1906. *Colonel H. T. Crook, J.P., V.D., D.L., M.Inst.C.E,

## AFRICA.

Africa. 1/150,000. Gold Coast. Sheets: North B30/J-IV., Wiawso; North B30/K.III., Obuasi; North B30/K.IV., Fumso; North B30/L.III., Kibbi; North B30/Q.I., Dunkwa; North B30/QII., Prahsu; North B30/Q.III., Tarquah; North B30/Q.IV., Cape Coast; NorthB30/R.I., Nsaba; North B30/R.III., Winnabah; North B30/W.I., Seccondee. 1st Edition. Issued by authority of Brig.-Gen. Sir F. G. Guggisberg, K.C.M.G., D.S.O., Governor. Surveyed under the direction of Lieut.-Col. R. H. Rowe. D.S.O., M.C., R.A., Surveyor-General and Major G. H. Bell, M.C., Director. Topographical Branch, Gold Coast Survey, Accra, West Africa. Edinburgh: W. and A. K. Johnston, Ltd., 1923. (Price, each sheet, 5/- unmounted, and 9/6 mounted on linen folded.) *The Surveyor-General, per the Publishers.

Carte du Congo Belge à l'échelle du 1/500.000. Sheets C3 Sud, Charleville; C4 Sud, Tshikapa; D3 Sud, Lusambo; D4 Sud, Dibaya; D5 Sud, Sandoa; D6 Sud, Dilolo. Forminière, Tableau d'Assemblage au 1/8.000.000.

Carte dressée par la Service Cartographique de la Société Internationale Forestière et Minière du Congo avec la collaboration du Service Cartographique du Ministère des Colonies. Supplement au Bulletin de la "Société Royale de Géographie de Bruxelles. Bruxelles: Institut Cartographique Militaire. 1923 and 1924. *Société Royale Belge de Géographie.

## CANADA.

Canada Geological Survey. Scale. 1/63.360, or 1 inch to 1 mile. Sheets: Chester Basin: Volger Cove, Lunneburg County, Nova Scotia. Minto, Sunbury and Queen's Counties, New Brunswick. Thunder Cave, Ontario. Cadomin, Alberta. Baskerville Area: Caribo District. Coquihhalla River Area, Yale District. Fraser River Delta. Chu Chua Creek; Clearwater River and Foghorn Creek; Louis Creek (North Thompson Valley), Kamloops District. Courtenay. Vancouver Island. British Columbia Ottawa: Department of Mines. 1923-1924. *Canada Department of Mines.

Canada Geological Survey: Cross and Pipestone Lakes Area, Manitoba. Scale, 2 miles to 1 inch. Ottawa: Department of Mines, 1924. *Canada Department of Mines.

Canada Geological Survey: Palliser—Kananaskis Area, British Columbia and Alberta. Scale. 1/126.720, or 1 inch to 2 miles. Ottawa: Department of Mines, 1923. *Canada Department of Mines.

Canada Geological Survey: Lake Athabaska, Saskatchewan and Alberta. Scale. 1/506.880, or 1 inch in 8 miles. Ottawa: Canada Department of Mines, 1923. *Canada Department of Mines.

Map of Portions of the Districts of Algona, Sudbury, and Timiskaming, Ontario. Scale. 1/506.880, or 8 miles to 1 inch. Ottawa: Canada Department of Mines, 1922. *Canada Department of Mines.

Canadian Arctic Expedition, 1913-1918 (Southern Party). Map of the Arctic Coast of Canada between Darnley Bay and Bathurst Inlet, District of Mackenzie, North-West Territories. Scale, 1/633.600, or 1 inch to 10 miles. Ottawa: Department of Mines, Geological Survey, 1923. *Canada Department of Mines.

## SOUTH AMERICA.

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Map of the Argentine Railways. Scale, 50 miles to 1 inch. London: 1908. *A Lady F.R.G.S.

Central Argentine Railways: Map of the Argentine Railways, 1920. Scale, about 35 miles to 1 inch. With six inset Maps. London. *A Lady F.R.G.S.

Buenos Ayres Great Southern Railway, 1921. Scale, 30 miles to 1 inch. London. *A Lady F.R.G.S.

### OCEANIA.

The Geology of Papua. By Evan R. Stanley, F.G.S., Government Geologist, Papua. Illustrations and Geological Map. Scale, 25 miles to 1 inch. Melbourne: 1924. *H.E. the Governor.

Eastern New Guinea and Adjacent Islands, showing district boundaries. Scale, 24 miles to 1 inch. *Mr. John Ainsworth, C.M.G., C.B.E., D.S.O.

Geological Map of Charters Towers Goldfields and Environs, to accompany Report on the Charters Towers Goldfield. G.S.Q. Pub. No. 256. By John H. Reid, Government Geologist, 1916. Scale, 1/6336. Six sheets. Brisbane: Queensland Geological Survey, 1919.

Ipswich Coalfield. Map No. 2 (six sheets). To accompany Report No. 271. Queensland Geological Survey. Also Ipswich Coalfield Sections.

New Zealand. Scale, 25 miles to 1 inch. Wellington: New Zealand Lands and Survey, 1924. *Mr. W. T. Neill, Surveyor-General.

## Atlases.

A New General Atlas, consisting of a series of Geographical Designs, on various Projections, exhibiting the Form and Component Parts of the Globe; and a Collection of Maps and Charts, delineating the Natural and Political Divisions of the Empires, Kingdoms, and States in the World. Edinburgh: John Thomson and Co., 1817. *Mrs. R. S. Brayshay.

Bacon's Shilling Atlas of Modern Geography for Families and Schools. London. *Mr. J. E. Balmer, F.R.G.S.

"Geographia": Authentic Atlas and Guide to London and Suburbs. London. *The Secretary.

An Agricultural Atlas of Wales, made on behalf of the Institute for Research in Agricultural Economics, University of Oxford, by J. Pryse Howell. Published by direction of the Ministry of Agriculture and Fisheries. Southampton: Ordnance Survey, 1921 *Colonel H. T. Crook, J.P., V.D., D.L.

Atlas över Sverige. Del I. and II. Stockholm: Svenska Turistföreningens, 1923 and 1924. *The Publishers (Swedish Touring Club).

Canada: Descriptive Atlas. Maps and Illustrations. Ottawa: 1922. *A Lady F.R.G.S.

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# Photographs, etc.

Twenty-nine Post Cards, various views, in Album. *A Lady F.R.G.S.

Photographic Views of Bournemouth and Neighbourhood. *Mr. J. E. Balmer, F.R.G.S.

Bird's-Eye View of the Isle of Wight. Ventnor. *Mr. J. E. Balmer, F.R.G.S.

The Album of Isle of Wight Views. *Mr. J. E. Balmer, F.R.G.S.

Lyme Regis: Photographic Views. *Mr. J. E. Balmer, F.R.G.S.

Gems of Torquay: A Collection of Sepia Photographs. *Mr. J. E. Balmer, F.R.G.S.

Twenty-four Views of Ilfracombe and Neighbourhood. *Mr. J. E. Balmer, F.R.G.S.

One Hundred and One Views of Manchester and District. London. *Mr. J. E. Balmer, F.R.G.S.

The English Lake Land: Album of Views. Kendal. *Mr. J. E. Balmer, F.R.G.S.

Twenty-four Views of Furness Abbey and Barrow. *Mr. J. E. Balmer, F.R.G.S.

View Album of Ullswater and District. Penrith. *Mr. J. E. Balmer, F.R.G.S.

Souvenir of Newcastle-on-Tyne. Sixteen Views. *Mr. J. E. Balmer, F.R.G.S.

Views of Bolton Abbey from Hartington Seat; Bolton Abbey and Stepping Stones; Bolton—The Stridd; Bolton Woods on the Wharfe; Bolton Hall; Ilkley—West View; Ilkley—The Tarn; Blea Tarn; Forth Bridge. *Mr. J. E. Balmer, F.R.G.S.

Historic York. 34 Water-colour *fac-similes* of England's most Picturesque City. London. *Mr. J. E. Balmer, F.R.G.S.

Two Hundred and Fifty Views—North Wales. London. *Mr. J. E. Balmer, F.R.G.S.

The North Cape, 1900. Sepia drawing by Tristram Ellis. (Framed, 31 in. by 21 in.) *A Lady F.R.G.S.

Description Géométrique détaillée des Alpes Françaises par Paul Heilbronner. Annexe du Tome Second, Les Origines Iconographiques de l'Oeuvre Géodesique. Dessinés et Peints par l'Auteur de 1899 à 1903. Paris: Gauthier-Villars et Cie, 1921. (Two copies.) *Paris, Lyons and Mediterranean Railway Company and the Publishers.

Passion: Ober-Ammergau. 12 Illustrations. Munchen. *A Lady F.R.G.S.

Cyprus: Twelve Postcard Views. London: Raphael Tuck and Sons. *The Colonial Commissioner for Cyprus.

Mount Everest from Tiger Hill. By Bourne and Shepherd, Calcutta. One out of the first Telephotographs of the Everest Range, taken about 20 years ago. (Framed Photograph, 21 in. by 19 in.) *A Lady F.R.G.S.

The North-East Arête of Mount Everest. Telephoto, by A. F. R. Wollaston. (Framed Photograph, 24 in. by 18 in.) *A Lady F.R.G.S.

Gaurisankar from the West. By A. F. R. Wollaston. (Framed Photograph, 24 in. by 18 in.) *A Lady F.R.G.S.

The Victoria Falls in the Dry Season. By Pedrotti. (Framed Photograph, 24 in. by 19 in.) *A Lady F.R.G.S.

Ottawa: Album of Views. *Mr. J. E. Balmer, F.R.G.S.

Picturesque Niagara. (Thirty-four Views.) *A Lady F.R.G.S.

Panorama of the Hudson: Showing both sides of the River from New York to Albany. New York: 1888. *Mr. J. E. Balmer, F.R.G.S.

The Grand Canyon of the Yellowstone Park, U.S.A.: Showing the Yellowstone River. By B. Oliver Mills. (Framed Picture, 17 in. by 15 in.) *A Lady F.R.G.S.

Mount of the Holy Cross, Colorado, U.S.A., 1898. (Framed Coloured Picture, 14 in. by 12 in.) *A Lady F.R.G.S.

Kaieteur Fall, on the Potaro River, Essequibo, British Guiana. By Anderson. Interchangeable in frame with "The Cedars of Lebanon Reservation." The Falls on the Hamilton River, Labrador, and Bird's-Eye View of the Panama Canal. All reproduced by the *Illustrated London News*. (18 in. by 13 in.) *A Lady F.R.G.S.

Maoriland Pictures. (Nineteen.) Joseph Braitwaite. Dunedin. *A Lady F.R.G.S.

Noted Trout Pool. Rotorua, New Zealand. (Framed Coloured Picture, 14 in. by 11 in.) *A Lady F.R.G.S.

Waimangu Geyser in Eruption, Rotorua, New Zealand. (Framed Picture, 14 in. by 11 in.) *A Lady F.R.G.S.

"An Ice Mushroom amongst the Mackellar Islets," Adelie Land, 1914. By Frank Hurley. Mawson Antarctic Expedition, 1911-1914. (Framed Photograph, 31 in. by 24 in.) *A Lady F.R.G.S.

"Grotto in an Iceberg." By H. G. Ponting. British Antarctic Expedition, 1910-13. (Framed Photograph. 36 in. by 28 in.) *A Lady F.R.G.S.

Mr. H. M. Stanley and Mrs. H. M. Stanley. (Photos.) *Mr. J. E. Balmer, F.R.G.S.

600 Film Negatives. Denmark, Kiel Canal, Gibraltar, Venice, Pompeii, Athens, Palestine, Aden, India, Burmah, Siam, Japan, Siberian Railway, West Africa, South Africa, Victoria Falls, East Africa, Uganda Railway, Niagara, Yellowstone Park, California, Salt Lake City, Harvard University, Alaska, Argentine, New Caledonia, New Zealand, etc. *A Lady F.R.G.S.

## Lantern Slides.

4.000 Lantern Slides. English and Scottish Coast, Cornwall, Scilly Isles, Derbyshire, Ingleton, English Cathedrals, North Wales, Paris, Egypt, Coal Mining, Rope and Twine Making, Flowers, Silk, Cotton, Wool, etc. *Captain S. H. Brooks, J.P., F.R.G.S.

Lantern Slides 78 British Isles, 35 European, 213 Asia, 36 Africa, 455 America, 12 Oceania, 225 General. *The Victorians.

## Museum.

Fifteen Shell Cameos, in frame. *A Lady F.R.G.S.

Two Large Cowrie Shells, with Cameos cut on them. *A Lady F.R.G.S.

Ten Transparent "Tassies," in frame. *A Lady F.R.G.S.

Ten Opaque "Tassies," in frame. *A Lady F.R.G.S.

Three Copies of the *Times* Newspaper. *A Lady F.R.G.S.

Inlaid Picture of the Pantiles, Tunbridge Wells. Tunbridge Wells Ware, inlaid with 30,000 pieces of wood of 140 different kinds, framed in the same ware. (10 in. by 7 in.) *A Lady F.R.G.S.

Block of Wood carved an inch in relief at Ober-Ammergau with a scene from the Passion Play. *A Lady F.R.G.S.

Gilt and Enamelled *replica* of a door in the Alcazar (Seville), framed in red velvet. (16 in. by 12 in.) *A Lady F.R.G.S.

Italian Picture of Wood "Inlay." *A Lady F.R.G.S.

Gold and Coloured Mosaic on Slate, representing St. Mark's, Venice, framed in carved wood. (9 in. by 7 in.) *A Lady F.R.G.S.

Colour Painted Wooden Russian Re-incarnation Figure, containing eight incarnations. *A Lady F.R.G.S.

Small Box of Russian Enamel with Coloured Sleigh Scene. *A Lady F.R.G.S.

Three Small Russian Ikons of different descriptions, bought in the Kremlin, Moscow. *A Lady F.R.G.S.

Twelve Small Indian Miniatures, painted in Colour, of Noted Buildings in India, mounted on velvet. (11 in. by 10 in.) *A Lady F.R.G.S.

Inlaid Brass and Enamel Indian Snake, used as a candlestick for the wall. *A Lady F.R.G.S.

Alabaster Tile, inlaid with Coloured Flowers, a copy of those used in the Taj Mahal. *A Lady F.R.G.S.

Burmese Carved Wood Picture in 2¾ in. relief. "Elephant Piling Teak." (17 in. by 17 in.) *A Lady F.R.G.S.

Carved Oval Frame of Nail-Wood, containing Six Chinese Carved Peach Stones, in high relief, mounted on velvet. (9 in. by 7 in.) *A Lady F.R.G.S.

Bracelet made from Chinese Seaweed, "Pong Wee." *A Lady F.R.G.S.

Japanese Lacquer-bound Book of Chinese Rice Pictures. *A Lady F.R.G.S.

Box of Cryptomeria Wood depicting Sacred Bridge at Nikko. *A Lady F.R.G.S.

Black Japanese Lacquer Tray, with Painting of Sacred Red Lacquer Bridge to the Royal Tombs in Nikko on Bronze Painted View. (9 in. by 9 in.) *A Lady F.R.G.S.

Three Japanese worked-metal Door-handles for sinking into Sliding Wall-doors. *A Lady F.R.G.S.

Small Box of Japanese "Broken Egg-shell" Lacquer painted with Gold. *A Lady F.R.G.S.

Red and Black Model of Japanese Torū. (12 in. high.) *A Lady F.R.G.S.

Five-Storied Inlaid Bronze Japanese Bell and Clapper. *A Lady F.R.G.S.

Japanese Colour-Painted Sea View on Grey "Shaved Velvet" foreground, depicted in "Unshaved Velvet." (14 in. by 10 in.) *A Lady F.R.G.S.

Two Japanese Pictures, Painted in Colour on Gold Lacquered Wood, with foreground of "Pinched Clay." Framed in Polished Cherry Blossom Lacquer. (18 in. by 14 in.) *A Lady F.R.G.S.

Arab Donkey Saddle-Bags. *A Lady F.R.G.S.

Three West African Silver Bangles of Native Work, brought from Lagos over 50 years ago. *A Lady F.R.G.S.

West African Chief's Wood and Engraved Steel Hatchet. *A Lady F.R.G.S.

West African Silver Zodiac Ring. *A Lady F.R.G.S.

Native Carved West African "Cameroon Stool" from Duala. *A Lady F.R.G.S.

Strip of West African fine Native Grass Matting dyed in Coloured Stripes. *A Lady F.R.G.S.

Two Nigerian Mats (Native work). *A Lady F.R.G.S.

Horsehair Work Link Chain from Madeira. *A Lady F.R.G.S.

Two Packs of Playing Cards: One of the White Pass and Yukon River Route, Alaska; the other Pack from the Yellowstone Park, each card printed with a different View. *A Lady F.R.G.S.

Native Pink Shell Necklace, West Indies. *A Lady F.R.G.S.

Engraved Calabash used as a Maté Teapot, in the Argentine, with its Bombillia (drinking tube). *A Lady F.R.G.S.

Engraved Argentine Drinking Horn. *A Lady F.R.G.S.

Rare Large "Orange Cowrie" Shell from the South Sea Islands. *A Lady F.R.G.S.

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Meteorology. By G. C. Simpson, D.Sc. Three Vols. Maps, Charts and Diagrams.

Report on the Maps and Surveys by F. Debenham, O.B.E., B.A., etc. Maps and Illustrations. (Price 10/- net.)

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Miscellaneous Data. Compiled by Colonel H. G. Lyons, F.R.S. Plan. (Price 5/- net.)

London : Harrison and Sons Ltd., for the Committee of the Captain Scott Antarctic Fund, 1919-1924. *Colonel H. G. Lyons, F.R.S., Hon. Editor, Publication of Scientific Results, Captain Scott Antarctic Fund.

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The Society, at the request of the Manchester Branch of the Geographical Association, has made provision for the permanent exhibition of geographical school books and atlases, which may be consulted by all teachers of Manchester and District. The following works have been received and have been placed in the Members' Room :—

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**Wisconsin Geographical Press, Maidson, Wisconsin.**

Physiographic Diagrams with letterpress. 1, Europe; 2, U.S.A.; 3, Trade of the World; 4, Climates of the World. 35 c. each.

# List of Corresponding Societies, etc. (Exchanges).

(*Nothing received.)

## BRITISH.

*Aberystwyth. National Library of Wales.
Belfast. Natural History and Philosophical Society.
Birmingham. Natural History and Philosophical Society.
Cardiff. Naturalists' Society.
Croydon. Natural History and Scientific Society.
Edinburgh. The Royal Scottish Geographical Society.
*Glasgow. Geological Society.
Glasgow. Royal Philosophical Society.
Hertford. Hertfordshire Natural History Society and Field Club.
*Hull. Yorkshire Naturalists' Union.
*Leeds. University Geography Department.
Leeds. Yorkshire Geological Society.
Leeds. Leeds Geological Association.
Leicester. Literary and Philosophical Society.
Liverpool. Geographical Society.
London. The Anti-Slavery Reporter and Aborigines' Friend.
London. British Association for the Advancement of Science
*London. British Museum. Copyright Office.
London. Colliery Guardian.
London. The Colonial Office Library.
London. The Royal Colonial Institute.
London. East India Association.
London. Royal Geographical Society.
*London. Royal Society of Literature.
*London. British South Africa Company.
*London. Emigration Information Office.
London. The Sociological Society.
London. India Office. (See List of Books.)
London. Royal Botanic Gardens. Kew.
London. The Near East.
London. War Office Library.
Manchester. The British Cotton Growing Association.
Manchester. Literary and Philosophical Society.
Manchester. The Manchester Museum.
*Manchester. The John Rylands Library.
Manchester. Godlee Observatory.
*Manchester. Egyptian and Oriental Society.
*Newcastle-on-Tyne. North of England Institute of Mining and Mechanical Engineers.
*Oxford. Bodleian Library.
*Penzance. Royal Geological Society of Cornwall.
*Rochdale. Literary and Scientific Society.

Salford. Museums. Libraries and Park Committee.
York. Yorkshire Philosophical Society.

## MISSIONARY.

London. Baptist Missionary Society.
London. Colonial and Continental Church Society.
London. Universities' Mission to Central Africa.

## COLONIAL.

Adelaide. Royal Geographical Society of Australasia. South Australian Branch.
Adelaide. South Australia, Department of Mines.
Brisbane. Royal Geographical Society of Australasia. Queensland Branch.
Brisbane. Queensland Museum.
Brisbane. Department of Mines. Queensland Geological Survey.
Bulawayo. Rhodesia Scientific Association.
*Cape Town. Royal Society of South Africa.
Cape Town. Mountain Club of South Africa.
Dehra Dun. Trigonometrical Survey.
*Georgetown. Royal Agricultural and Commercial Society of British Guiana
Halifax. Nova Scotia Institute of Science.
Johannesburg. South African Geographical Society.
*Johannesburg. University of Witwatersrand.
*Melbourne. Royal Geographical Society of Australasia. Victorian Branch
*Melbourne. Government Statist.
Ottawa. Department of Mines, Geological Survey.
Ottawa. Dominion Bureau of Statistics.
Perth. Western Australia. Geological Survey.
*Port Moresby. Papua. H.E. the Governor.
*Quebec. Société de Géographie.
Sydney. N.S.W. Department of Mines, Geological Survey.
Toronto. Royal Canadian Institute.
Victoria, B.C. Minister of Mines. Province of British Columbia.
Wellington, New Zealand. Department of Lands and Survey.

## FOREIGN.

Abo. Academy of Abo.
Alger. Société de Géographie d'Alger et de L'Afrique du Nord.
Ann Arbor. The Michigan Academy of Science.
Antwerp. Société de Géographie d'Anvers.
Baltimore. John Hopkins University.
Baltimore. Maryland Geological Survey.
*Barcelona. Sociedad de Geografia Commercial.
Belgrade. Société de Serbe de Géographie.
Belgrade. Geogrefskom Odscku Universiteta.
Berkeley. University of California.
Berlin. Gesellschaft für Erdkunde.
Bern. Geographische Gesellschaft.
*Bremen. Deutsche Geographische Blätter.
Brussels. Bulletin Officiel du Congo Belge.

Brussels. Société Royale Belge de Géographie.
Brussels. Le Mouvement Géographique.
*Brussels. Institute Coloniale Internationale.
*Brussels. La Société d'Etudes Coloniales.
*Brussels. International Arctic Commission.
Bucharest. Societatii Regale Române de Geografie.
Budapest. Société Hongroise de Géographie.
*Budapest. Magyar Adria Egyesület Közlönye. (Hungarian Adriatic Association.)
*Buenos Aires. Ministerio de Agricultura de la Nacion.
Buenos Aires. Museo Nacional de Historia Natural.
Buenos Aires. Museo de la Plata.
*Buenos Aires. Direccion General de Estadistica Municipale de la Ciudad de Buenos Aires.
*Buenos Aires. Instituto Geografico Argentino.
Buenos Aires. Sociedad Argentina de Estudios Geograficos.
*Cairo. Survey of Egypt.
Cairo. Société de Géographie d'Egypte.
Cambridge. Peabody Museum of American Archæology and Ethnology Harvard University.
*Chicago. Field Museum of Natural History.
*Chicago. The John Crearar Library.
Christiania. Norges Geografisk Opmaaling. (See List of Maps.)
Constantinople. British Chamber of Commerce of Turkey and the Balkan States.

Copenhagen. Kongelige Danske Geografiske Selskab.
*Darmstadt. Verein für Erdkunde.
*Dijon. Société Bourgurgnonne de Géographie et d'Histoire.
Dijon. L'Académie des Sciences. Arts et Belles-Lettres.
*Douai. Union Géographique du Nord de la France.
Dresden. Verein für Erdkunde.
*Dunkerque. Société de Géographie.
Firenze (Florence). Rivistà Geografica Italiana.
Florence. Institutio Geografico Militare.
*Frankfurt-am-Main. Vereins für Geographie and Statistik.
Geneva. Société de Géographie.
Geneva. Société des Anciens Elèves de l'Ecole Supérieure de Commerce.
*Greifswald. Geographische Gesellschaft.
*Halle. Verein für Erdkunde.
Hamburg. Geographischen Gesellschaft.
Havre. Société de Géographie Commerciale.
*Havre. Société Géologique de Normandie.
Helsingfors. Société de Géographie de Finlande.
*Helsingfors. Société Finlandaise de Géographie.
*Jena. Geographische Gesellschaft.
Krakow. Institut Géographique de l'Université.
*La Paz. Sociedad Geográfico.
La Plata. Museo de Natural de La Plata

La Plata. Dirección General de Estadistica de la Provincial de Buenos Aires. Departamenta Provincial del Trabajo.
La Plata. Dirección General de Estadística y Departmento Provincial del Trabajo.
Leipzic. Gesellschaft für Erdkunde.
Lille. Société de Géographie.
Lima. Sociedad Geogràfica.
Lima. Cuerpo de Ingenieros de Minas del Peru. Congreso Nacional de la Industria Minerva.
Lima. Asociación Peruana para el Progreso de la Ciencia.
Lisbon. Sociedade de Geographia de Lisboa.
*Lübeck. Geographische Gesellschaft.
Lwow (Lemburg). Société Polonaise d'Ethnologie.
Madison, Wisconsin Academy of Sciences, Arts and Letters.
Madison, Wisconsin Academie of Sciences, Arts and Letters.
Madison. Wisconsin Geological and Natural History Survey.
Madrid. Real Sociedad Geografica.
Madrid. Ayuntamiento de Madrid.
Mankato, Minnesota. Journal of Geography.
Marselle. Société de Géographie et d'Etudes Coloniales.
*Metz. Verein für Erdkunde.
Mexico. Sociedad Mexicana de Geografia y Estadistica.
Mexico. Sociedad Cientifica "Antonio Alzate."
Milan. Societá Italiana di Esplorazioni Geograpfiche e Commarciali.
Milan. Touring Club Italiano.
Montevideo. Estadístico de la República Oriental del Uruguay.
Montevideo. Museo Nacional.
Montpellier. Société Languédocienne de Géographie.
München. Geographische Gesellschaft.
*Nancy. Société de Géographie de l'Est.
*Nantes. Société de Géographie Commerciale.
Naples. Societá Africana d'Italia.
Neuchatel. Société Neuchateloise de Géographie.
New Haven. Connecticut Academy of Arts and Sciences.
New York. American Geographical Society.
New York. American Museum of Natural History.
New York. Public Library.
Novara. Instituto Geografico de Agostini.
Nurnberg. Naturhistorische Gesellschaft.
Oran. Société de Géographie et d'Archéolgie.
*Para Museu Paraense de Historia Natural e Ethnographie.
Paris. Société de Géographie.
Paris. Société de Géographie Commerciale.
Paris. Comité de L'Afrique Française et du Comité du Maroc.
*Paris. Colonies et Marine.
*Paris. Directeur du Service Géographique de l'Armée.
*Paris. Service Géographique. Ministère des Colonies.
*Paris. Société de Topographie de France.

*Paris. Société de Spéléologie.
Philadelphia. American Philosophical Society.
Philadelphia. Geographical Society.
Philadelphia. The Commercial Museum.
Philadelphia. University of Philadelphia Museum.
Poynan. Société des Amis des Sciences.
*Prague. The Czech Geographical Society.
*Prague. Ministère de L'Agriculture de la République Tchécoslovaque.
Quito. Socieda Geografica.
Rochefort. Société de Géographie.
Rolla. Missouri Bureau of Geology and Mines.
Roma. Reale Societá Geografica.
Rome. International Institute of Agriculture.
Rome. Commissariato Generale dell' Emigrazione.
*Rome. Direction Générale de la Statistique.
*Rouen. Société Normande de Géographie.
St. Louis. Washington University.
Shanghai. Chinese Maritime Customs.
Shanghai. Ministry of Communications. Directorate General of Posts.
Stockholm. Svenska Sällskapet för Antropologi och Geografi.
*Strassburg. Gesellschaft für Erdkunde und Kolonialwesen.
Stuttgart. Württembergischen Verein für Handelsgeographie.
*Tokyo. Geographical Society.
Tokyo. National Research Council of Japan.
Toulouse. Société de Géographie.
*Upsala Geological Institution of the University of Upsala.
Urbana. Illinois State Geological Survey.
Vienna. Geographischen Gesellschaft in Wien.
*Vienna. Verein der Geographen an der Universität Wien.
Vienna. Naturhistorischen Hofmuseums.
Washington. D.C. National Geographic Society.
*Washington, D.C. Department of Commerce. Bureau of Foreign and Domestic Commerce.
Washington, D.C. Department of Commerce. United States Coast and Geodetic Survey.
Washington, D.C. U.S. Geological Survey.
*Washington, D.C. U.S. Geographic Board.
*Washington, D.C. U.S. Board of Surveys and Maps.
*Washington, D.C. Secretary of the Interior.
*Washington, D.C. National Research Council.
Washington, D.C. Smithsonian Institution.
Washington. D.C. U.S. National Museum.
*Washington, D.C. Department of the Interior. Bureau of Education.
Washington, D.C. U.S. Department of Agriculture.
Washington, D.C. Library of Congress.
Washington, D.C. Pan-American Union.
Washington, D.C. Carnegie Institution. Department of Terrestrial Magnetism.
*Washington, D.C. Carnegie Endowment for International Peace.
Zurich. Geographisch-Ethnographischen Gesellschaft.

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Linney, J. W.
Little, David Ainsworth
Littler, Henry Landon
aLivesley, Miss G. E.
Lomas, J. A.
Longden, A. W.
Low, Robt. H.
aLowe, Miss Christine
hLugard, Rt. Hon. Sir Frederick D., G.C.M.G., C.B., D.S.O.
Lumb, Miss Bessie
Lyth, Wm.

Macara, Sir C. W., Bart., J.P.
McCormick, Miss
hMacdonald, Major-Gen. Sir J. R. L., R.E., K.C.I.E., F.R.G.S.
McDougall, Charles
McDougall, Robert
aMcEwan, Miss Agnes
McFarlane, H. H.
M'Grath, W. A., M.B.E.
Makin, John A.
*Manchester Corporation, Free Libraries Committee
Mandleberg, Sir G. C., J.P.
Mandleberg, Colonel S. L., J.P
Marshall, K. L.
cMarrs, F. W.., M.A., Bombay
Marsden, Albert
Marsden, H.
lMarsden, James, J.P.
Marsh, Miss Cecilia

Marten, Miss G. M., M.A.
LMartin, Horace C., F.R.G.S.
Martin, Richard (Heaton Moor).
Martin, Richard (Pendleton)
Marx, Charles
Massey, Councillor L. F.
LMather, L. E., F.R.G.S.
AMaybury, J. H.
AMaybury, W. H.
Mead, A. Reginald
Medlyn, Wm. John, M.I.E.E.
Melland, Edward
LMellor, E. W., J.P., F.R.G.S., F.R.P.S.
LMellor, Captain G. R., M.C.
Mellor, Robert
AMellowes, C. L.
Miers, Sir Henry A., D.Sc., F.R.S., Vice-Chancellor Manchester University.
Miller, Mrs. K. I.
Milligan, Sir Wm., M.D.
Mills, Albert
Mills, F. G.
HMoor, Rt. Hon. F. R., Natal
AMorgan, J. Spencer
Morrisey, Rev. Hugh, M.A.
LMort, Miss G. E.
AMorton, Miss M. E.
Moscrop, Thomas
Mottram, Charles
Moyes, Miss Effie
Mudie, Miss Doris, F.R.G.S.
Munro, Miss A. I.
Munro, Miss E. J.
Murray, Miss Mary

Nall, Colonel Sir Joseph, D.S.O., M.P.
HNansen, Dr. F., G.C.V.O.
Nanson, Miss W.
ANeale, Miss Marguerite
Needham Thomas Ashby, B.A
Neild, F. E., F.C.A.
Nichol, Thomas
Nightingale, Thos. H., M.B.E.
Nuttall, Mrs. Harry
ANuttall, R. Wilson
ANuttall, Mrs. R. W.

cOederlin, F.
Ogden, Miss
Ogden, Frank
Ogden, H. W., B.Sc.
Ogden, Thomas
cOgilvie, Alan G., O.B.E., M.A., M.Sc., F.R.G.S.
O'Hara, Rev. M.
Oldham, H. Yule, M.A., F.R.G.S., Cambridge
cO'Neill, H. E., F.R.G.S.
Openshaw, Miss Eleanor A.
Openshaw, Miss E. N
Osborne, F. B., M.A
Over, Miss S. G.
Owen, Douglas J. J.

APaine, Miss
Palmer, Dr. L. S., M.Sc.
Panting, Harold Mitchell
Parkinson, J. B.
Parkinson, T. W. F., M.Sc., M.Ed., F.G.S.
Parr, James
Pearson, Miss Eva
Philips, Miss
Phythian, J. Ernest, M.A
Pickstone, Ewin
Pidd, Arthur J.
APidd, Miss Maggie E.
Pilkington, Lawrence, J.P.
cPingstone, G. A.
Polak, Miss Bertine
Pollitt, Miss Annie
APollitt, Miss N.
APoole, Miss Louie
APotts, Mrs.
Prestwich, Mrs. H.
Price, John Walter, F.R.G.S.
Proctor, Miss Florence
Proctor, Wm.
Proudfoot, W.
Prusmann, Robert Henry

sPurrett, Miss N.

Qualtrough, Miss Kate, F.R.G.S.
Quirk, J. C.

Radford, C. G., M.A.
LRagdale, J. R., C.A., J.P.
LRandles, Sir John S., J.P.
ARedfearn, Mrs.
Rée, Alfred, Ph.D.
HReed, Mrs. J. H.
ARees, Miss Dorsney
sReid Robert, J. S.
LReiss, Alec
Renshaw, James
ARenshaw, Miss L. W.
Rhodes, Sir Edward, J.P.
Rhodes, John Glyn
ARichardson, Miss M.
Richmond, Wm., J.P.
Rickett, W. R. (H. Whitworth, Ltd.)
ARiley, Miss A. L.
Riley, Mrs. Anne
Rimmer, Miss Mary
Roberts, F. Cawley
LRoberts, Frederic Walter
Robinow, Edward
Robson, J. Walter, J.P.
Rogerson, James
Royse, A. E.
Russell, Miss Marion
ARyder, Miss

Sale, Thomas Edwin
Salford, the Rt. Rev. the Bishop of
*Salford Corporation Free Libraries Committee
Sandiford, Miss Ethel
ASang, Dr. Janet, A. I., L.R.C.P.
Scott, W.
Searle, Roland George
Segalla, Emil
ASenior, Miss Helena G.
Sever, John
Shaw, A. E.
Shaw, A. W.
AShaw, Miss Isabel
Short, W. Harry
Silas, C. D.
Silvester, Mrs. Phyllis
Simmons, C. L.
Simon, Councillor Ernest D., M.A.
ASmethurst, Miss M.
Smith, C. W., B.A., F.R.G.S.
ASmith, Miss E. E.
Smith, J. H. H., J.P.
Smith, Sidney
Smith, T. M.
Smith, W. Egerton, F.C.A.
ASouthern, John E.
ASowerbutts, T. H. B.
Sowerbutts, T. W., F.R.G.S.
ASpencer, Miss M. R.
ASpencer, S.
Spencer, Wm.
Staniforth, Harry
Stansfield, Mrs. Edith
LSteinthal, Egbert
Stephens, Sir W., J.P.
sStephenson, Miss Hilda H.
ASterling, Mrs. R. A.
LStonehewer, Walter
Stordy, Mrs.
Storey, Henry E., J.P.
Stowell, Hugh
Streat, E. Raymond
Stringer, J.
sSummerville College, The Principal
Sutton, Charles, F.A.I.
cSwaine, Capt. Geo. Raymond, F.R.Met.S.
Swainson, R. H.
cSwallow, Capt. R. W., B.Sc.
ASweeney, Miss Frances
Swithenbank, Edwin, J.P.
LSykes, Arthur H., D.L., J.P.

Talbot, Miss Maud, M.A., M.Ed.
Tattersall, Herbert W.
ATatton, Lees W.
ATaylor, Albert, J.P.
ATaylor, Miss Elsie
ATaylor, Miss Florence M.
Taylor, Fred

Taylor, George
Taylor, John Tyson
Taylor, Mrs. Knox
Taylor, Mrs. Lily
ATaylor, Miss Lucy
Taylor, William
ATeggin, Miss L.
Tetlow, Wm. H.
LThomas, George, J.P.
Thomas, Robert
cThomson, J. P., LL.D., Brisbane
Thomson, Miss Marie
Thomson, R.
Thorley, Chas. P.
Thorpe, Walter
Tilzey, Oliver
LTinker, Miss Marian E.
ATodd, Miss Dorothy H., B.A.
ATomkins, T. F.
Tout, Prof. T. F., M.A.
LTrafford, Sir Humphrey F. de, Bart.
Tulk, Arthur Albert
HTulloch, Angus A. G., O.B.E., D.L.
Turner, A. Lawson
Turner, F. (H. Whitworth Ltd.)
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sTyldesley Higher Education Committee

AVarley, Miss

Walkden, Arthur
Walker, James William
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AWallace, Miss Edith
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LWallace, Reginald W.
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LWard, Wm. H.
cWarren, Geo. H.
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Watson, Joseph
Webster, Harold
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Whale, Miss Alice G., M.A.
Whitby, W. H.
AWhite, Miss Minnie
sWhitehead, Miss Ellen E.
Whitehouse, Mrs. E. C.
Whiteside, Mrs. Harriett, B.A.
AWhiteside, Miss Marjorie
Whiting, Miss G.
LWhittaker, Mrs. A. H
Whittle, Herbert B.
AWhittle, Miss L.
Whitworth, Herbert
Wihl, G.
Wild, Harold E.
AWilkinson, Miss L. E.
AWilkinson, Miss D.
AWilkinson, Miss Edith
AWilkinson, Miss F.
Wilkinson, Mrs. Thomas
Wilkinson, Wm.
AWilkinson, Wm.
Willcock, Thomas
HWillcocks, Major-General Sir James, G.C.M.G., D.S.O.
Williams, Arnold, C.A.
AWilliams, Miss G. M.
AWills, Mrs. Margaret
Willson, J. Harcourt
cWilmore, Albert, D.Sc., F.G.S., F.R.G.
Wilson, Arthur
Winfield, Miss H
Winstanley, E. V.
Wise, W. L.
Wood, A. W.
LWood, George W. Rayner, J.P
Wood, Henry
Wood, Mrs. M. A.
Wood, Miss Margaret
Woodhead, Miss E. M.
LWoodhead, Mrs. M. J.
Woodhouse, J. H., F.R.I.B.A

Woodward, Mrs.
Woolfenden, Joseph
Woolley, Reginald
Worsley, Albert
Wragg, Miss Christine W.
Wright, Miss Ada
A Wright, Miss Annie Y.
Wright, Reginald
Wyatt, Mrs. S. G.
Wylde, Miss Bertha

Yates, Walter
Young, Leonard

Zimmern, Captain N. H., M.C.
Zimmern, W. H.

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# APPENDIX

# Loan Exhibition of Old Maps.

## Introductory Note.

### HISTORICAL CARTOGRAPHY.

Historical Cartography, or the study of the evolution of maps, is a branch of history involving wide geographical knowledge. It is distinct from pure geography, which is a study of the surface of the earth, distinct also from historical maps, which are drawn by modern geographers to show the names and political divisions of the past in accordance with the researches of modern historians. Old maps and their facsimile reproductions show the geographical ideas of the past, the rise of geography in the ancient world, its eclipse during the Dark Ages, its renaissance during the later Middle Ages, and its sudden expansion in the 16th century. In studying the evolution of geographical ideas we are in effect studying the history of the world by a method not only picturesque and fascinating, but probably as accurate and comprehensive as if art or war or religion or politics or economics or any other special base line were chosen, from which to start a survey of historic time. The interest is more human than technical.

### GREEK CARTOGRAPHY.

The Greeks knew the earth was a sphere and that their "known world" was only a small part of its surface.

> Strabo writes: Eratosthenes . . . says that . . . if the extent of the Atlantic Ocean were not an obstacle we might easily pass by sea from Iberia to India still keeping in the same parallel. *Strabo, Book i., Chap. iv., para.* 6.
>
> And further: Posidonius . . . supposes that the length of the inhabited earth is about 70,000 stadia, being the half of the whole circle on which it is taken; so that, starting from the west, one might, aided by a continual east wind, reach India in so many thousand stadia.
>
> *Strabo, Book ii., Chap. iii., Para.* 6.

Ptolemy (2nd century A.D.) was the first great scientific cartographer. He was not a traveller, but he collected all the data he could from records and from contemporary travellers, then combined the information, plotting the result on globe or map. In one passage he himself explains his methods:

> . . . it might have seemed advisable to reduce the distance of 36,200 stadia by more than a half. But let us keep the reduction within the half and calculate the distance on a round estimate of 22,625 stadia or 45¼ degrees.

Colonel Yule (Cathay and Way Thither) comments:

> It is evident that Ptolemy first drew his maps, embodying all the information that he had procured, however rough and vague it might be. From these maps he then educed his tables of latitude and longitude. and his systematic topography. The result is that everything assumes an appearance of exact definition: and indications on the map which meant no more than "somewhere hereabouts is said to be such a country" became translated into a precision fit for an Act of Parliament.

No map drawn by Ptolemy survives. It is uncertain how far the extant manuscript maps ascribed to Ptolemy (the earliest being 12th century) are accurate copies of maps made by Ptolemy. But the tables of latitude and longitude compiled by Ptolemy survive. Their genuineness, as the work of Ptolemy, is just as good as that of the Greek classics or the codices of the New Testament—and from these tables portions of the maps of Ptolemy have frequently been re-plotted by modern students.

## THE DARK AGES.

When the Roman Empire declined and fell, geography, together with other learning, was buried in the ruins. All globes were lost—Ptolemy's writings alone survive of genuine geography. The Peutinger Table cannot be called geographical in the ordinary sense, though it is most interesting as dating probably in its origin from the time of Pliny. Of Byzantine cartography, the Madaba Mosaic is apparently the only extant specimen. The Arabs were great travellers, but poor cartographers—Arabic maps are supposed to have been copied from Ptolemy. Mediæval maps were pictorial and theological, the exact representation of the surface of the earth being of secondary consideration.[a]

Some of the writings of Ptolemy were translated into Syriac and from Syriac into Arabic. Rough maps are found in Arabic literature.[b] Every mosque had a rough diagram of some kind on its walls so that the faithful might know the direction of Mecca when saying their prayers. The map of Edrisi, compiled during the 12th century for Roger, king of Sicily, is described below. Sicily was at that time a meeting-place for sailors and travellers—Greeks, Arabs, Italians, Catalans, and it is possible that geographical research may gradually reveal some kind of maritime tradition in the Mediterranean from the Minoan Ages through Phœnicians, Greeks, and Arabs, down to the Renaissance.

## THE RENAISSANCE.

In the 13th century A.D. the Italian and Catalan seamen started a new era in cartography. They made real charts for the practical purposes of navigation. These charts are known as *portolani*. *Portolano* is the Italian word for a book of sailing directions,[c] *carta* being the word for chart, but Nordenskiöld and other writers have adopted the word *portolano* to indicate the charts of the 14th, 15th, and 16th centuries. The magnetic compass came into use at the end of the 12th century, but it is doubtful whether it was used in the construction of *portolani*. They were probably slowly built up by taking the averages of large numbers of estimated distances between ports and headlands, and then plotting on parchment the courses so obtained with their estimated orientations. The result was an outline of the coast, and by the end of the 13th century a sort of typical *portolano* of the Mediterranean had developed. The *portolani* are covered with lines drawn radially from various centres. These lines are called "loxodromes." They were not used in the construction of the charts. They were drawn afterwards, and were merely to help the seaman to get his bearings, like the compass points on modern charts.

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[a] Mr. Michael C. Andrews has elaborated the classification of Mediæval Mappæ Mundi into (1) *Œcumenical*, or those attempting to depict the known habitable world, and (2) *Hemispherical*, or those which, recognising the sphericity of the earth, attempted to show the relation of the habitable to the unknown and uninhabitable.

[b] A few such maps are on exhibition at the John Rylands Library; see No. 9 for photo reproductions of two; one a world map of the T-O type (13th century), the other a world direction diagram with Mecca at the centre (early 15th century).

[c] A "portolano" is on exhibition at the John Rylands Library; see No. 11 for photo reproduction of a page.

The *portolani*, whatever their origin, were, in so far as they charted the shores of the Mediterranean and the western coasts of Europe, a great advance on Ptolemy. In the Catalan World Map, 1375 (made for Charles V.), and in Behaim's Globe, 1492 (made for the municipality of Nuremburg), the improvement in the area mentioned is clearly due to the *portolani*. But the charts themselves had been made by and for seamen merely for the practical purpose of navigation. They were thrown away when worn out, like old ropes and sails, as indeed is too often the modern custom nowadays when replaced by newer and more up-to-date editions. No student studied *portolani* and no librarian collected them till the 19th century.

## THE AGE OF DISCOVERY.

The maps and globes from 1492 till towards the end of the 16th century are among the chief sources for the history of the Age of Discovery. The dream of the explorers was to reach Cipangu and Cathay with their gold and silks and wealth of every kind. The perplexity caused by reaching other lands—the uncertainty for more than a generation as to the real outlines of those lands—the early belief in a channel through the isthmus which has only in our own day been pierced by the Panama canal—the first rounding of the southern land by Magellan—the total failure of all attempts to make "the North-West passage"—in no way can the mystery and romance of the period be better realised than by a study of the old maps and globes.

The early explorers of North America thought they had struck the Cathay of the Middle Ages, and the maritime discoverers of China were uncertain till the 17th century whether they had really reached the famous "Cathay" of mediæval times.

Mercator's Globe of 1541 shows the main outlines of the continents except Australia, which had to wait till the 18th century, when Captain Cook completed its circumnavigation and reduced to polar limits the "Terra Australis" of the old cartographers.

## SCIENCE AND ART.

Though geographical discovery is the prime interest to the student of historical cartography, other interests are involved.

Progress in geography depended on the progress of scientific knowledge and on graphic and artistic presentation. The Greeks were fairly good at observations for latitude, but they were very much at sea with longitude—nor could they measure with accuracy long lineal distances on the surface of the earth. They made the diameter of the earth one sixth too small. This mistake was one element in the cartography of the late 15th century as shown on Behaim's globe, Japan, to the explorer sailing westward from the Canaries, seemed as near as Florida. Columbus and his friends were consequently much encouraged in their westward adventure. Even Sir Isaac Newton at the close of the 17th century was a bit puzzled in his earlier calculations by assuming the correctness of Ptolemy's estimate of the size of the earth. Longitudes were inaccurate till the introduction of chronometers in the 18th century.

As regards material, the Egyptian maps were on papyrus; Roman maps probably on stone; the earliest Chinese maps on wood and silk. In the 2nd century A.D. paper was first used for Chinese maps. European mediæval maps and *Portolani* were on parchment and on ox hide. Printing from copper plates began in the 15th century; steel engraving and lithography in the 19th. Chromolithography began about 1840 A.D. Previous to that date all coloured maps were coloured by hand. The mezzotint colour-printing process of the 18th century was not applicable to maps.

Napoleon offered a prize for the invention of some process by which hills could be clearly shown on a flat surface, a problem which was not satisfactorily solved till the end of the 19th century.

## THE INTERNATIONAL MAP.

Finally, in the realm of achievement it should be noted that, even though international statesmen cannot ensure perpetual peace, yet agreement has been arrived at for an international map of the world on a uniform scale of 1 : 1,000,000 or approximately 16 miles to 1 inch. Some sheets have already been issued. When complete, the map will consist of 2,084 sheets, and will cover a globe 42 feet in diameter.

# Section I.

# Early Maps (Mills Collection).

## List of Maps and Globes.

| MAP. | | ORIGINAL. | | | REPRODUCTION. |
|---|---|---|---|---|---|
| | Date. | Name. | Where Preserved. | Size in inches. | |
| 1. | B.C. 1400 | TURIN PAPYRUS | TURIN | — | Reduced photo |
| 2. | B.C. 50—A.D. 1235 | PEUTINGER TABLE | VIENNA | 240×13 | Full |
| 3. | A.D. 1490 | PTOLEMY | — | — | 33″×20″ |
| 4. | 6th Cent. A.D. | MADABA MOSAIC | MADABA | 600×240 | c. ⅒th |
| 5. | 6th Cent. A.D. | COSMAS | FLORENCE & ROME | — | — |
| 6. | 8th Cent. A.D. | ALBI | ALBI | — | — |
| 7. | A.D. 1050 | BEATUS (St. Sever) | PARIS | 23×14 | Full |
| 8. | A.D. 1150 | BEATUS | MANCHESTER (Rylands Library) | 21×15 | Full |
| 9. | 1154 | EDRISI | PARIS | 132×52 | Outline tracing |
| 10. | A.D. 1300 | HEREFORD, MAPPA MUNDI | HEREFORD | 52 dia. | About ⅔rds |
| 11. | Circa 1300 | CARTE PISANE | PARIS | 42×21 | Full |
| 12. | Circa 1300 | CARIGNANO | — | 20×14 | Full |
| 13. | 1339 | DULCERT | — | 50×20 | Full |
| 14. | 1351 | LAURENTIAN PORTOLAN | — | — | — |
| 15a. | 1375 | CATALAN MAP | PARIS | 58×19 | Full |
| 15b. | 1375 | CATALAN MAP | PARIS | 58×19 | Slightly reduced |
| 16. | 1410 ? | BORGIAN MAPPA MUNDI | MANCHESTER (Rylands Library) | 25 dia. | Slightly reduced |
| 17. | 1492 | MARTELLUS | — | — | — |
| 18. | 1492 | BEHAIM'S GLOBE | NUREMBERG | — | Full |
| 19. | 1493 | LAON GLOBE | PARIS | 6¾ | Outline |
| 20. | 1500 | JUAN DE LA COSA | MADRID | 144×36 | — |
| 21. | 1502 ? | CANERIO | PARIS | 88½×45 | Full* |
| 22. | 1502 | CANTINO | MODENA | 86×41 | Full* |
| 23. | 1502–04 | MUNICH-PORTUGUESE | MUNICH | 41×44 | Full* |
| 24. | 1503–05 | PILESTRINA | MUNICH | 33×43 | Full* |
| 25. | 1507 | WALDSEEMÜLLER MAP | WÜRTEMBURG | 87×49 | Full |
| 26. | 1507 | WALDSEEMÜLLER GLOBE | VIENNA | 4½ dia. | Outline diagram |
| 26(*a*). | 1508–11 | LENOX GLOBE | NEW YORK | 5 dia. | |
| 27. | 1508 | RUYSCH | — | — | — |
| 28. | 1515 | SCHÖNER GLOBE | FRANKFORT | 10½ dia. | Outline diagram |
| 29. | 1516 | WALDSEEMÜLLER | WÜRTEMBURG | 89×47 | Full |
| 30. | 1519 | MAIOLLO | MUNICH | 19×13 | Full* |
| 31. | 1519 | MUNICH-PORTUGUESE | MUNICH | 49×25 | Full* |
| 32. | 1523 | TURIN-SPANISH | TURIN | 79×39 | Full* |
| 33. | 1523 ? | "HOLBEIN" GLOBE | NEW YORK | 7½ dia. | Outline diagram |

| | | | | | |
|---|---|---|---|---|---|
| 34. | 1525–27 | Salviati | Florence | 82×37 | Full* |
| 35. | 1525–30 | Wolfenbüttel | Wolfenbüttel | 32×27 | Full* |
| 36. | 1527 | Maiollo | Milan | 68×23 | Full* |
| 37. | 1527 | Weimar-Spanish | Weimar | 85×34 | Full* |
| 38. | 1529 | Ribero | Weimar | 85×36 | Full* |
| 39. | 1529 | Ribero | Rome | 55×23 | Reproduced |
| 40. | 1529 | Verrazano | Rome | 102×51 | Full* |
| 41. | 1533 | Schöner Globe | Weimar | — | Outline diagram |
| 42. | 1541 | Mercator Globe | Brussels | 16 dia. | Outline diagram |
| 43. | 1544 | Cabot | Paris | 85×43 | Reduced |
| 44. | 1536 | Desceliers | London | 98×47 | Full |
| 45. | 1546 | Desceliers | Manchester (Rylands Library) | 98×50 | Full |
| 46. | 1550 | Desceliers | London | 86×53 | Full |
| 47. | 1600 ? | Wright | — | 25×17 | — |
| 48. | 1611 ? | Hondius | Würtemburg | 96×66 | Full |

* Photographs by E. L. Stevenson, from originals.

# Group A. Pre-Columbian.

## 1. TURIN PAPYRUS, B.C. 1400.

This is a rough topographical map of gold mines in Upper Egypt. It is a photograph from a reduced coloured facsimile in Chabas' *Œuvres*, Vol. ii., p. 208, Paris. It is said to be the oldest map in the world. The site of the gold mines is unknown but they are supposed to have been near the Red Sea.

## 2. PEUTINGER TABLE, A.D. 1235.

An itinerary or road map of the Roman Empire in the form of a distorted diagram. This is a full-sized facsimile (published by Desjardins, in Paris, A.D. 1869) of a manuscript preserved at Vienna. This manuscript was copied in A.D. 1235 by a monk in Colmar from some material now lost. The date and authorship of the original are unknown. Dr. Konrad Miller, of Stuttgart (writing 1888), ascribes it to a certain Castorius of the 4th century A.D. Mannert, of Leipzig (writing 1824), suggests the 3rd century A.D. Desjardins (writing 1885), who made a very full and careful study of the western end of the table, thinks that it was the work of several authors making additions at different periods. For instance, there is a picture of a church at Ravenna not built until the 6th century. The equal representation of Rome, Constantinople, and Antioch, points to the period about A.D. 350 ; and so on. Desjardins conjectures that the original dates from the time of Cæsar Augustus, and was probably the Orbis Pictus mentioned in Pliny's *Historia Mundi*, Book iii., chapter 2.

### 3. PTOLEMY, 2nd Century A.D.

Ptolemy was a Greek, who lived at or near Alexandria during the first half of the 2nd century A.D. He wrote in Greek a treatise on Geography, with an atlas of twenty-seven maps, and a list giving the latitudes and longitudes of each place on the maps. One map shows the world from the Atlantic to China, and from Scotland to Equatorial Africa. The other twenty-six show particular portions on a larger scale. The map here exhibited is from Nordenskiöld's *Facsimile Atlas*. It is the reproduction of a map printed in Rome in A.D. 1478 from a MS. drawn a few years previously.

### 4. MADABA MOSAIC, 6th Century A.D.

The Madaba Mosaic forms part of the floor of a church near the village of Madaba, in Moab, some 15 miles to the east of the north end of the Dead Sea. It dates from the 6th century, when (prior to the Moslem invasion) Madaba was an important town on the trade route between Damascus and the Red Sea, and the seat of a bishop since the time of Constantine. The map shows Palestine, with portions of Arabia and Egypt, including the mouths of the Nile. It must have been originally about 50 feet by 20 feet, but is much damaged. The figures have been deliberately obliterated, perhaps by Moslem superstition. There is a large figuring of Jerusalem, which has been found useful by students in determining topographical problems about the plan of the city at that time. A little bit of the Mediterranean is still visible.

The mosaic was discovered in 1896 by a French missionary, and the photographs show the position of the church and the mosaic on the floor.

The coloured facsimile was published a few years ago by the German Palestine Exploration Fund.

If the Turin Papyri are excluded as not real maps, the Madaba Mosaic is the oldest known map extant.

### 5. COSMAS, 6th Century A.D.

Cosmas, an Egyptian commercial traveller and afterwards a monk, wrote a treatise denouncing the Greeks and their damnable doctrine of the sphericity of the world. These photographs give his own ideas of the structure of the world.

### 6. ALBI, 8th Century A.D.

Designed to illustrate the cosmography of Julius Honorius and of Orosius.

> Poor though it is, the Albi map as it stands is the unaltered work of the time of Bede and Charles Martel (c. A.D. 730) and, accordingly, venerable as the oldest geographical monument of Latin or Western Europe in the Middle Ages.
> (Beazley.)

### 7. BEATUS (St. Sever copy), A.D. 1050.

Beatus, a Spanish monk of the 8th century, made (circa A.D. 687) a pictorial and theological world map, the original of which is lost.

The photo reproduction of ten extant maps made at various times between the 8th and 13th centuries are supposed to be more or less copies of the lost Beatus. This one is a facsimile, by Konrad Miller, of the Beatus known as " St. Sever," dating from about A.D. 1050, and preserved at Paris.

### 8. BEATUS, Rylands,[a] 1150 c.

Shows much Moorish influence, and was probably produced in the northern part of Spain. Compare with the Turin copy.

### 9. EDRISI, 1154.

The following notes are taken from the French translation of Edrisi's Geography by P. Amédée Jaubert. Edrisi describes how Roger of Sicily wanted to know full statistics of his own dominion and information about the rest of the world. Besides consulting the works of 12 earlier Arab geographers, Edrisi consulted travellers, attempting to harmonise their stories. The map shows, what the author admits, that he has been influenced by Ptolemy in the general size and shape of the Earth. The large tracing is from the MS. map (A.D. 1367) in Paris, the photos are full size of the N.W. corner of the map and the reduced printed sheet is from Schrader's Atlas (1907).

### 10. HEREFORD, A.D 1275—1307

This is a reduced facsimile (by Konrad Miller, 1896) of the map in Hereford Cathedral. The Hereford map is a typical mediæval map, with Jerusalem at the centre, Paradise at the top (which is east), and the world adapted to the circle into which it has to fit. The British Isles are visible at the edge. The Hereford map is fully described in a monograph published in 1874 by the late Archdeacon Beavan, who thinks that the author was Richard of Haldingham, and that the date lies between A.D. 1275 and A.D. 1307.

The original map is 5 feet in diameter, and is drawn in colours on parchment. The inset enlargement of the British Isles is from Gough's British Topography, 1780.

### 11. CARTE PISANE, A.D. 1300 (c).

A portolan generally assigned to early 14th century. It shows all the coasts of the Mediterranean, the Black Sea, and those of the Ocean. The dark outline is that of the skin on which the chart was drawn.

### 12. CARIGNANO, A.D. 1300 (c).

This is one of the earliest extant *portolani*. There is an inscription on it—*Johannes Presbyter rector Sancti Marci de portu Januae me fecit*—and a certain Giovanni da Carignano has been traced as a priest of the church of St. Mark, in Genoa, in 1306.

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[a] Original on exhibition at John Rylands Library; copy presented to the University by the Governors of the John Rylands Library, Manchester.

### 13. DULCERT, A.D. 1339.

This is a Catalan *portolano* signed and dated by Angelino Dulcert of Majorca. Monsieur E. T. Hamy has written a monograph on this map in the *Bulletin de géographie historique et descriptive*, Paris, 1887.

This map marks the beginning of a new age, showing discovery of the Canaries by the Genoese, improved outline of the Bay of Biscay and Sea of Azov, the junction of the Blue and White Nile, etc. Dulcert knows very little of the African coast exploration, but fills up the interior with pictures and inscriptions. One king is at war with the coast tribes, another with Prester John of Ethiopia. There is plenty of gold, but the natives are black and naked. In the north of Norway there are white bears who eat raw fish. In the east of the map is one of the wise men with a star above his head. The compass is divided into 32 points for the first time in this map.

### 14. LAURENTIAN PORTOLANO, 1351.

This is remarkable for the indication it gives of the wide sweep of the Gulf of Guinea and the possibility of rounding Africa a century and more before the discoveries of the Portuguese.

### 15a. CATALAN WORLD MAP, A.D. 1375.

This is the name given to a world map made for Charles V. of France, and now preserved in Paris. It is on parchment, coloured brilliantly, and mounted in leaves to fold like a screen. This is the finest map of the Middle Ages. The western portion is based on *portolani*, the eastern portion on Ptolemy and on the traditions of Marco Polo and other mediæval travellers. Note the fine Arabian ships and the pearl divers, and the fights between pigmies and cranes, according to legend, and the voyage of exploration along the coast of Africa.

### 15b. CATALAN WORLD MAP.

Slightly reduced and mounted as a screen as were the original sheets.

### 16. BORGIAN MAP, 1410 (?).

A reduced facsimile[a] of what is in all possibility the oldest printed map extant.[b] It is printed from a map of the world engraved on metal, preserved in Cardinal Stephen Borgia's Museum at Velletri.

### 17. MARTELLUS, 1492.

This shows the result of the Diaz voyage, 1486.

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[a] Presented to the University by the Governors of the John Rylands Library.
[b] On exhibition at the John Rylands Library.

### 18. BEHAIM'S GLOBE, 1492.[a]

Martin Behaim was born at Nuremberg, A.D. 1459. In 1484 he went to Portugal on business. He married and settled down in the Azores islands. He was not a seaman nor a cartographer, but probably made voyages on business or as a passenger. In 1490–93 he re-visited Nuremberg, where he was employed by the Town Council to make a globe. In 1493 he returned to Portugal, where he died in 1507. His globe had no influence on discovery, but is of the greatest interest to us as showing geographical ideas just before the discovery of America. In Europe it shows the outline of land and sea from the *portolani* described above. In Africa it shows the result of Diaz's voyage rounding the Cape in 1486. In Asia it is still mainly from Ptolemy, with the added traditions from Marco Polo, especially the island of Cipangu, rumoured to lie 1,500 miles beyond China. This full-sized coloured facsimile was made by the late Mr. Ravenstein (for many years cartographer to the Royal Geographical Society) and published with a book giving full details of Behaim's life and globe by Geo. Philip & Son, 1908.[b]

### 19. LAON GLOBE, 1493.

This is a small copper-gilt globe, only $6\frac{3}{4}$ inches diameter, which seems to have once formed part of an astronomical clock. It was discovered in 1860 by M. Leroux in a shop in Laon. Its author and origin are unknown. It has on it an inscription—" Hucusq : Portugalen : navigio : pervenere : 1493," and for that reason it is dated 1493. Ravenstein conjectured that those words are an addition, and that the globe is older. The author could not have known of the Diaz expedition of 1486, but he records " Mons Niger," which was discovered by Diego Coro in 1485. So that very likely the Laon globe is the oldest extant globe in the world.

## Group B. Age of Discovery.

### 20. JUAN DE LA COSA, A.D. 1500.

Juan de la Cosa was owner and mate of the ship in which Columbus sailed on his first voyage across the Atlantic. In 1493 and 1499 Juan de la Cosa made further voyages. In 1500 he made a map, 12 feet by 3 feet, on an ox hide, brilliantly coloured, and now preserved at Madrid. This was the first map (still extant) made after the discovery of America. Note the strip of coast north of Cuba, with the legend, *Mar descubierta por Inglese* (sea coast discovered by the English), and marked with the English flag. Note also the line of demarcation arranged between the Spanish and Portuguese at the Treaty of Tordesillas, 7th June, 1494, to be a meridian 370 leagues west of the Cape Verde Islands. Juan de la Cosa made further voyages across the Atlantic, and was killed in a fight with natives at or near Cartagena in 1510.

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[a] The mounted globe has been kindly lent by Miss Burstall, Head Mistress, Manchester High School.

[b] For other pre-Columbian maps, see *British Isles* 49, 50, 51, and *China* 232.

This reduced facsimile is from the proceedings of the Royal Society of Canada. A full-sized coloured facsimile was published at Madrid in 1892.

### 21. CANERIO, 1502 (?).

Neither title nor date of execution appears on the chart which represents the coast regions of the world as they were known at the beginning of the 16th century. In the lower left-hand corner is *Opus Nicolay de Canerio Januensis.*

We are left to conjecture whether this excellent specimen of early cartography was produced in Portugal, the country whose language in the main is employed, or in Italy, the native country of its author, and whether it was executed on specific order as was the Cantino chart, or is one of those maps, of which there were many, drawn by official cartographers in that day and also perhaps by enterprising unofficial but expert map-makers, which maps could be purchased in the principal seaports of Spain and Portugal.—*Stevenson.*

### 22. CANTINO, 1502.

Cantino was an envoy in Portugal of the Duke of Ferrara, and this map was procured by Cantino for the Duke. It is based mainly on Portuguese discoveries. It shows Newfoundland (called *Terra del Rey de portuguall*) pulled well over to the east or Portuguese side of the line of demarcation. It refers to the third voyage of Columbus (1498—1500), to the voyage of Cabral (1500), who struck South America by accident on his way to India, and to the voyage of Hojeda (1499—1500), whom Amerigo Vespucci accompanied along the north coast of South America. The "Antilles" are first named in this map. Greenland is marked *A Parte de assia*, meaning Asia. The recent Portuguese discoveries in India are shown. The map was pasted on a screen and preserved in the palace of the Duke of Modena till 1859, when the palace was wrecked by a mob and the map stolen. Some years later it was found in a pork butcher's shop and taken to the library at Modena, where it is now preserved.

### 23. MUNICH-PORTUGUESE, 1502—1504.
### (Kunstmann, No. II.)

This map is probably the work of an Italian draftsman on Portuguese data. The curious shadings, like fingers, west of Newfoundland, have not been explained. A legend to the east of Cuba alludes to the discoveries of Columbus. A legend to the east of South America calls it *Terra Sancte Crucis*, a name given by Cabral in 1500. Prester John appears sitting on his throne in Abyssinia.

### 24. PILESTRINA, 1503—1505.

This map is written partly in Portuguese, partly in Italian. It was made to show Portuguese discoveries. Degrees of latitude are shown. The names are very clear and full down the west coast of Africa. The map ends at *Rio do imfante*, the limit of the voyage of Diaz, 1486.

## 25. WALDSEEMÜLLER, 1507.

Waldseemüller was the cartographer who christened America. He was born about A.D. 1470 at Radolfzell, studied at Freiburg, lived at St. Dié in Lorraine, and died in 1521.

In April, 1507, he published a book called *Cosmographiæ Introductio,* in which the following sentences occur :—

" Quarta orbis pars, quam quia Americus inuentit, Amerigen, quasi Americi terram siue Americam nuncupare licet . . . .

Alia quarta pars per Americum Vesputium inuenta est : quare non video, cur quis iure vetet ab Americo inuentore sagacis ingenij viro Amerigen, quasi Americi terram, siue Americam dicendam : cum et Europa et Asia a mulieribus sua sortita sint nomina."

(*The fourth part of the world ought to be called Amerigen, or perhaps America, as being the land of Americus, because Americus discovered it. . . . .*

*The other fourth part was discovered by Americus Vesputius, so that I do not see why anyone rightly objects to its being called Amerigen, as the land of Americus from Americus, the discoverer, a man of sense and ability, or America, since their names have been bestowed upon Europe and Asia by women.*)

Amerigo Vespucci was born in Florence in 1451. He was educated at San Marco, and went into business in the Medici firm. In 1492 he was sent to Spain as their agent. He has been described as " a civil and plausible beef contractor," who contracted to supply some of the expeditions of Columbus. In 1499 he accompanied in some capacity the expedition of Hojeda, mentioned above.

In September, 1504, he wrote in Italian a letter to a friend in Florence describing four voyages which he said he had made to the New World. Vespucci's letter was translated into French, then from French into Latin, and reprinted as an appendix to Waldseemüller's Cosmography. In the same year, Waldseemüller published a large map of the world, 7 feet by 4 feet, in an edition of one thousand copies, every one of which (except one proof copy) has been lost. In that map the word " America " is printed (for the first time on a map) over the southern part of the continent, and there is a portrait of Vespucci at the top of the map.

In 1516, he published another world map about the same size, but on a different projection. It is called the " Carta Marina." In this second map neither the word " America " nor the portrait of Vespucci appear, and " Terra de Cuba Asie partis " is printed over a bit of the northern mainland. In a long note in the left-hand bottom corner both Columbus and Vespucci, together with Marco Polo and other people, are thanked for information.

In 1901, Father Fischer, S.J., found by accident in an old library in Würtemburg a bound volume containing proof sheets of both large maps. In 1904 they were reprinted in facsimile and published by Henry Stevens, Son and Stiles (London).

Amerigo Vespucci was appointed chief pilot of Spain in August, 1508, and held office till he died in February, 1512, never anticipating the immortality which (as an American historian has observed) "ignorance and euphony were to attach to his name." Vespucci's letters were widely read at the time. They must have attracted the attention of Sir Thomas More, who utilises Vespucci in "Utopia." More was in Flanders in 1515–16, and had evidently just got hold of Vespucci's "Four Voyages," for he describes meeting in Antwerp one of the twenty-four men mentioned in the following passage from the "Four Voyages":—"We left the twenty-four men in the fort with provisions for six months, twelve bombards, and many other arms. We had made friends with all the natives round, of whom I have made no mention in this voyage, not because we did not see and have intercourse with an infinite number of tribes; for we went inland with thirty men for a distance of 40 leagues and saw so many things that I refrain from recounting them."

## 26. WALDSEEMÜLLER GLOBE, 1507.

This, according to Father Fischer, is the small globe, 4½ inches diameter, made after the map. On the 7th April, 1507, Waldseemüller wrote to a friend, "Solidum, quod ad generale Ptholomei paravimus, nondum impressum est, erit autem impressum infra mensis spacium." ("*The globe which we have prepared to accompany the Ptolemy world-map is not yet printed, but will be in a month.*")

In February, 1508, writing from Strasburg to another friend, he delights over his map and globe of the previous year:—

"Cum his diebus Bachanalibus solatij causa, qui mihi mos est, in Germaniam venissem e Gallia: seu potius ex Vogesi oppido cui nomen Sancto Deodato, ubi ut nosti meo potissimum ductu labore, licet plerique alij falso sibi passim ascribant. Cosmographiam universalem tam solidam quam planam non sine gloria et laude per orbem disseminatam nuper composuimus: depinximus: et impressimus."

"*As usual for solace in these Bacchanalian days I have come to Germany out of France, or rather out of the Vosges town of St. Dié, where, as you know, by my most strenuous efforts (which several other people falsely claim as their own) the world-map and the globe (both circulated world-wide, not without praise and glory) we recently designed, drew and printed.*"

Though the Latin language is famous for precision, scholars are uncertain whether the object of Waldseemüller was to avoid the Bacchanalian days of France or enjoy those of Germany.

The globe has the same outline as the map, but very few names. The word "America" is much more conspicuous on the globe, being the only word on the southern continent.

## 26a. LENOX GLOBE, 1508-11.

A copper globe discovered in Paris in 1855, now in the Lenox Library, New York. In its New World representation South America appears as a large island having three regional names: Mundus Novus: Terra Sanctae Crucis: Terra de Brazil.

### 27. RUYSCH, A.D. 1508.

This man probably accompanied John Cabot on his second voyage. Terra Nova represents both our Newfoundland and modern Labrador shown as one coast.

From Nordenskiöld's *Facsimile Atlas.*

### 28. SCHÖNER GLOBE, 1515.

Johann Schöner was born at Carlstadt, in Lower Franconia, on the 16th January, 1477. He was educated at Erfurt University. In 1504 he settled in Nuremberg, studying mathematics and astronomy, and corresponded with Copernicus. In 1515 he took priest's orders, and was given a prebend at Bamberg. In 1520, owing to neglect of prebendal duties for mathematical pursuits, he was removed from his prebend to a country parish four miles from Bamberg. He married and became a Protestant, and, on the advice of Melanchthon, he was appointed mathematical professor at the new Gymnasium at Nuremberg. In 1546 he retired from the professorship, and on the 16th January, 1547, he died at the exact age of 70. He is known to have made four globes—1515, 1520, 1523, 1533—copies of three of which (for certain) are still extant. He probably made others as well. Stevens and Coote give a bibliography of 46 publications by him on mathematics, astronomy, astrology, geography, medicine, etc.

The special interest of his 1515 globe is that it was based on information of a voyage through the Straits of Magellan some years before the expedition of Magellan. Magellan did not reach the Straits till the 11th October, 1520, and the survivors of his expedition did not return to Spain till 27th August, 1522. Wieser thinks the first voyage, which was a Portuguese expedition, may have been as early as 1509. Another interest of this globe is that it re-introduces the large *Terra Australis,* which had been a feature of mediæval geography, and which lasted on in maps till the 18th century, when it was reduced to Polar limits by Captain Cook.

### 29. WALDSEEMÜLLER, 1516.

See note to Waldseemüller map, 1507.

### 30. MAIOLLO, 1519.

This map is good for the islands in the West Indies and for South America up to about 1515.

There is a scale for latitude.

### 31. MUNICH-PORTUGUESE, 1519.
### (Kunstmann, No. IV.)

This is the oldest known map showing the discovery of the Pacific Ocean by Balbao in 1515. MAR VISTO PELOS CASTELHANOS is recorded to the west of the Isthmus of Panama. The line of demarcation is taken as the prime meridian, and it has been suggested that this map was based on an official chart used at the conference of Spanish and Portuguese pilots in 1515. South America is marked *Brasill.* The English flag is shown on Iceland.

### 32. TURIN—SPANISH, 1523.

This map was made specially to show Spanish discoveries. The *Tierra de dizienbre* (*dezembre*) at the end of South America is probably from del Cano, the survivor of Magellan's voyage round the world.

### 33. " HOLBEIN " GLOBE, 1523 (?).

In 1533 Holbein painted in London a picture known as " The Ambassadors," now in the National Gallery. In that picture there is a globe (inserted presumably for artistic purposes) painted upside down. Some names are painted right way up out of compliment to the Ambassadors who had resided at or were interested in those places.

In 1885 the late Mr. Henry Stevens found the gores of a globe which he and Mr. Coote (of the British Museum) identified as the lost globe made by Schöner in 1523. On this point cartographic experts differ. Harrisse maintained strenuously that the Stevens' gores cannot have been made by Schöner. Nordenskiöld was positive that they must date later than 1540. Wieser concurred with Stevens and Coote.

In 1900 Miss Mary Hervey (who had solved the riddle as to who the Ambassadors were) wrote a monograph on the picture, and pointed out that the globe in Holbein's picture was evidently the same as that of the Stevens' gores, the date of which must be therefore 1533, or earlier. (*Holbein's " Ambassadors,"* by Mary Hervey. Bell, 1900.)

The survivors of Magellan's expedition (after doing penance at Seville Cathedral for having somewhat mysteriously lost a day during their circumnavigation of the globe, and having consequently kept their feasts and fasts all wrong) went to Valladolid to the Court of the Emperor Charles V. Maximilianus Transylvanus, an intelligent young man at the Court, had long talks with the returned travellers, and on the 24th October, 1522, sent an account of the expedition in a long letter to the Cardinal of Salzburg in Germany. This letter was printed in Cologne in January, 1523, and became generally known. So the Stevens' gores showing the track of Magellan's expedition may well date from 1523, even if not by Schöner.

### 34. SALVIATI, 1525–27.

The names are in Spanish, the legends in Latin. The map is supposed to have belonged to Cardinal Salviati, Papal Nuncio in Spain, 1525—1530. China appears at the left of the map. A picture and legend celebrate the first circumnavigation of the globe by Magellan's expedition, 1518–22.

### 35. WOLFENBÜTTEL—SPANISH, 1525-30.

This map (of Spanish origin) is specially interesting for the inscription giving the origin of the name Labrador, though at first applied to modern Greenland.

" Tiera del labrador. Laqual fue descubierta por los Yngleses dela uila de bristol e por q el q dio el lauiso della era labrador de las islas de los acares le quido este nobre." Meaning Labrador was discovered by the English from the town of Bristol, and is so called because the one who first sighted the country was a labourer of the Azores islands, and so they gave it the name of Labrador.

China and portions of the Malay Archipelago appear on the left.

The black band is merely a metal strip to prevent the parchment creasing.

### 36. MAIOLLO, 1527.

The " Vesconte de Maiollo," the maker of this map and of " Maiollo, 1519," was a Genoese. On this map there is an inscription :—" Vesconte de Maiollo conposuy hanc cartam in Janua anno dny 1527 die XX decenbris." (The 2 in 1527 has been altered to 8.)

The sources on which this map were based included not only Spanish and Portuguese but also French discoveries.

In 1524 an expedition sailed from Dieppe in Normandy, commanded by Verrazano, a Florentine, but under the patronage of the King of France. The word " Francesca " is written over North America, and the French flag is shown. French names also appear as follows :—" Norman Villa," " Anguileme," " S. de germano," " diepa." North and South America are separated by a strait marked " stretto dubitoso." The Malay Archipelago is shown.

### 37. WEIMAR—SPANISH, 1527.

This map was probably drawn for the Emperor, Charles V., and taken by him to Rome. In 1530 it was taken to Nuremberg. In 1811 it was acquired by the Grand Duke Karl August and deposited in the library at Weimar.

The line of demarcation, also latitude and longitude are shown.

### 38. RIBERO, WEIMAR, 1529.

Ribero was a famous cartographer of whom little is now known. In 1524 he was a member with Sebastian Cabot and Gomez of a geographical congress at Badajos, and in 1529 he probably took part in the negotiations which led to the treaty of Saragossa settling Spanish and Portuguese differences. This map was not a chart used by seamen, but a map for general information based probably on Spanish official records. The legends on the map describe the peculiarities of the various regions ; for instance, on the coast then called Labrador, but really Greenland, a legend : " Esta tierra descubrieron los Ingleses no aÿ en ella cosa de proveeho." (*This country was discovered by the English, and there is nothing in it worth having.*)

### 39. RIBERO, ROME, 1529.

Another copy of Ribero's map is preserved in the College of the Propaganda at Rome. A large (apparently facsimile) copy of the Propaganda map was lent by His Holiness Pope Leo XIII. (the scholarly Pope) for exhibition at the Colonial Exhibition in South Kensington in 1886. A reduced chromo-lithograph copy of the loaned map was made by W. Griggs, and published in London 15th November, 1886. This is one of the Griggs edition. It is slightly different from the Weimar Ribero.

### 40. VERRAZANO, 1529.

This map was made by Hieronimus de Verrazano, the brother of Giovanni de Verrazano, who explored North America for Francis I. in 1524. There is a legend on the map—*Hieronemus de Verrazano faciebat*, and another over North America— *Verrazano siue noua gallia quale discopri* 5 *anni fa giovanni di Verrazano fiorentino per ordine et commandameto del Chrystianissimo Re di francia.*

There are Italianised French names, as in "Maiollo, 1527," such as "Dieppa," "San germano," "Angolemme," "Tolon villa," "vendomo."

Greenland is marked TIERRA LABORATORIS, agreeing with the explanation of the word given in "Wolfenbüttel, 1525–30."

Hakluyt (writing in 1582) mentions a map which "Master John Verrazanus gave to King Henry VIII.," but it is not clear that his reference is to this particular map.

The map came into the possession of Cardinal Stephen Borgia, who alluded to it in a letter dated 31st January, 1795, and who bequeathed it to the College of the Propaganda in Rome, where it is now preserved.

The words "Terra America" are marked about the position of the present Venezuela.

### 41. SCHÖNER GLOBE, 1533.

The circumnavigation of the globe by Magellan's expedition would be naturally supposed to have improved geographical ideas, but for Schöner it had the opposite effect. It convinced him that the land shown by Waldseemüller, 1507, and by his own 1515 globe, to the north-west of Cuba was really part of Asia; that the Mexico, where Cortes had been prosecuting conquests, was really China; that, in fact, North America and Asia were one large solid continent. This idea is shown in his 1533 globe, and was adopted by other globe and map makers for some years. Schöner explains his ideas in the extract below, from a book published with the globe in 1533. Although published in 1533, the expression "very lately" implies that the words were written some years earlier.

"At the east, all that which is beyond the country of the Chinese and 180° longitude has remained unknown to Ptolemy. But after Ptolemy, beyond 180°, towards the east, numerous regions have been discovered by one Marco Polo, a Venetian, and others. And in our own days, the Genoese Columbus and Americus Vespucius reached those shores after having sailed from Spain across the Western Ocean, and visited them thinking that this part of the world is an island. They called it America, the fourth part of the globe. But very lately, thanks to recent navigations accomplished in the year A.D. 1519 by Magellan towards the Molucca Islands, which are situate in the extreme east, it has been ascertained that the said country is the continent of Upper India, which is a portion of Asia."—*Extract from Schöner's Opusculum.*

## 42. MERCATOR, 1541.

Gerhard Mercator was born in 1512 at Rupelmonde, in Flanders, and graduated at Louvain University. In 1536 he married and, in order to support his family, adopted cartography as a profession. In 1537 he published a large map of Palestine, now lost, and in 1538 a weird world-map on what is known as the cardiform projection (Nordenskiöld's Facsimile Atlas XLIII.). Mercator in his 1538 map avoids Schöner's mistake and keeps America well clear of Asia by a large sea. In 1541 he published his large globe, 16 inches diameter. For many years it was lost, but about A.D. 1875 an original was found, and full-size gores in facsimile were published in Brussels, where the original is (or was) preserved. In the 1541 globe the Pacific is becoming quite a respectable ocean. " Terra Australis " is also a great feature. At one time Mercator believed in a theory that the globe is a hydrosphere in which the earth-crust floats freely according to hydrostatic laws.

In 1544 Mercator was imprisoned for heresy, but released after about four months owing to the remonstrance of the authorities of Louvain University. In 1569 he published his map of the world on the projection which has made his name famous. It was about 80 inches by 50 inches. The only known extant copy is preserved at Paris.

In 1570 an atlas which he had been long preparing was ready for printing, but he postponed publication in order not to injure the sale of an atlas published by his friend, Ortelius, and this complete atlas was not published till 1595, the year after his death. In 1552 Mercator moved from Louvain to Duisburg (near Düsseldorf) where he lived till his death on the 2nd December, 1594.

## 43. SEBASTIAN CABOT, A.D. 1544.

Sebastian Cabot was the son of John Cabot, an Italian. John Cabot sailed from Bristol in May, 1497, reached Cape Breton Island, there indicated as *Primas tierre vista*, and was back in Bristol by the end of July of the same year. Next year he sailed again, in April. See Winship, *Cabot Bibliography*, 1900–1, 579 items, Biggar, *Revue Historique* X., Paris, 1903, and Beazley, *John and Sebastian Cabot*, London, 1908.

But Sebastian Cabot had a long and varied career. He was born, probably in Venice, before March, 1474. His name is mentioned in connection with letters patent issued by Henry VII. in 1496, and he seems to have remained in the service of England till 1512, when he went to Spain. For 35 years (1512—1547) he was in the service of Spain. In 1518 he was appointed pilot major. In 1522–23 he intrigued for employment by Venice. From 1526—1530 in charge of an expedition to South America. After his return arrested, imprisoned, and ordered to be banished to Morocco, but apparently got the better of his opponents, and continued in Spanish employ till 1547. The next ten years of his life (1547—1557) were spent in England. Charles V. tried to get him back, but Cabot seems to have thought his old head safer in England, and the Government of the day found him useful, though he continued to intrigue with other Powers. In 1555 he was made Governor of the Company of Merchant Adventurers, and took special interest in the expedition of Willoughby and Chancellor to find a north-east passage to China. In 1508—1509, during his previous English employ, he is supposed to have himself gone on an expedition to find the north-west passage to China. The date and place of his death are unknown. While in Spanish employ he made the large world-map known as "Cabot's Planisphere." This reduced facsimile is from the *Proceedings of the Royal Society of Canada.*

### 44, 45, 46. DESCELIERS, 1536—1546—1550.

These three maps are by Pierre Desceliers, a priest of Arques, near Dieppe. The original of 1546 is in the Rylands Library at Manchester. Originals of the other two are in the British Museum. These facsimiles were produced in 1898 in a limited edition with a monograph by the late Mr. C. H. Coote, then in charge of the Map Room at the British Museum.

In the 1536 map the Pacific Ocean reaches close to the east coast of Florida, as in Maiollo, 1527, and other maps. The 1546 and 1550 maps are graduated for latitude and longitude, but they cover only 280 degrees of longitude owing to want of information as regards the Pacific.

Japan, which in Behaim, 1492, was near the site of Mexico, is seen returning westwards in these maps. Australia has a large extension which has given rise to some controversy. For the last word on the subject, see a paper in the *Geographical Journal* for August, 1914, by Mr. J. A. J. de Villiers, now in charge of the Map Room at the British Museum.

### 47. WRIGHT, A.D. 1600.

This is one of the first (if not the first) English world-maps. A.D. 1600 is the date of the foundation of the East India Company. This is the map alluded to by Shakespeare in "Twelfth Night," Act iii., scene 2, where Malvolio is described in the words, "He does smile his face into more lines than are in the new map with the augmentation of the Indies." "Twelfth Night" was produced for the first time in the Hall of the Middle Temple, February, 1601–2. Wright's map, which is drawn on Mercator's projection, was published in the second edition of *Hakluyt's Voyages*, 1598—1600.

This facsimile is from Vol. 59 of the Hakluyt Society, published in 1878.

### 48. HONDIUS, 1611 (?).

This large map (according to an engraved inscription on the map itself) was drawn by Judocus Hondius, who was born in Ghent in 1563, lived in London from 1583 to 1594, then settled in Amsterdam till his death in 1611. In 1604 he bought the plates and probably other geographical material which had belonged to Mercator, and in 1606 published a new edition of Mercator's Atlas with fifty new plates. Hondius was engaged on this large world-map till nearly the time of his death, which was sudden and it is not certain when it was published.

The figures at the bottom of the Eastern hemisphere include portraits of Hondius and Mercator. The woman, it is probable, was intended to represent his wife, and the two young men his sons, Judocus and Henricus. The latter was famous as an engraver.

The only copy of the original edition of this map known to exist was found by Father Fischer, S.J., in an attic of the Castle of Würtemburg, where he had found Waldseemüller's maps. It was in an advanced condition of decay, but the bits were carefully collected and pieced together at Rome under the supervision of Dr. Ehrle, S.J., Librarian at the Vatican. The map was then photographed in Germany, reproduced in New York, and published in 1907 under the joint auspices of the American Geographical Society and the Hispanic Society of America, together with a small explanatory pamphlet by Professor Stevenson. Hondius's map was a great advance geographically, but artists consider it "decadent" compared, say, with the bold primitive touch of the Byzantine Madaba.

# Section II.

# British Isles (Booker Collection).

(Those marked * belong to Mills Collection.)

## Introductory Note.[a]

The maps are arranged under six separate divisions, the maps in each division being in chronological order :

1. British Isles.
2. England.
3. English Counties.
4. Scotland.
5. Ireland.
6. Charts of the British Seas.

The cartography of the British Isles stretches from Ptolemy to the present day. Ptolemy's methods have been described above. The two mediæval maps (Matthew Paris, 1250, and Bodleian, 1300) were not measured surveys in the modern scientific sense, but were genuine attempts at real topography, and therefore in striking contrast to the Beatus and other mediæval world maps. In the geographical renaissance of the 14th and 15th centuries, and in the great Age of Discovery in the 16th century, the explorers were seamen, not landsmen, and their maps were sea-maps showing coastline, not land-maps showing the interiors of countries. It was not, therefore, till towards the end of the 16th century that the definite mapping of land areas began—and the areas were naturally those countries most influenced by the revival of learning and the increase of commerce. The printing of maps from copperplates began in the latter part of the 15th century. Ptolemy's maps were first printed in A.D. 1472, but it was not till A.D. 1546 that the first printed map of the British Isles was drawn by an Englishman, George Lilly, and published in Rome. The Dutch School founded by Mercator the cartographer (A.D. 1512—1594) and Ortelius the publisher (A.D. 1527—1598) produced Atlases which included maps of the British Isles. In general cartography the Italians, then the Dutch, then the French, were ahead of the British—so that until the 18th century many maps even of the British Isles bear the names of foreigners.

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[a] For a fuller treatment, see the following works by Sir H. George Fordham:
(i.) Maps: their history, characteristics, and uses. C.U.P. 7/6.
(ii.) Studies in Carto-Bibliography. Ox.U.P. 6/-.

The following summary of cartography in general may be useful :[a]

*Manuscript Maps.*

| | | |
|---|---|---|
| I. Study of the Earth and its surface by Babylonians, Egyptians, and Greeks. | Extant maps : Turin and Madaba, and the text of Ptolemy's *Geographia*. | 1400 B.C. to Ptolemy 2nd century A.D. |
| II. Decline of geographical knowledge and scientific cartography in Western Europe, but possible survival among Arabs. | i. Roman itineraries and mediæval Mappæ Mundi, Arabic maps.<br>ii. Portolani or seamen's charts of Mediterranean | i. 2nd to 13th centuries.<br>ii. 13th to 15th centuries. |

*Printed Maps.*

| | | |
|---|---|---|
| III. Revival of Ptolemy and the Age of Geographical Discovery. | Development of world maps from revival of Ptolemy and expansion of portolani. | 15th to 16th centuries. |
| IV. Modern Cartography. | Italian, Dutch, French, and English map and atlas makers.<br>i. empirical methods increasing in accuracy.<br>ii. triangulation and levelling by accurate methods. | i. 16th and 17th centuries.<br>ii. 18th to 20th centuries. |

## CARTOGRAPHY OF BRITISH ISLES.

Sir H. George Fordham has divided British cartography into the following three periods :[b]

| | Character of Maps. | Prime Meridian. | Period. |
|---|---|---|---|
| I. 1579—1673. (*Saxton to Blome*) | Early and archaic. | Azores or Canary Is. | Dutch School. |
| II. 1673—1794. (*Seller to Cary*) | Modern and detailed maps with roads. | St. Paul's, London. | French and, later, English Schools. |
| III. 1794—present. | Surveys by exact triangulation and levelling. | Greenwich. | Ordnance Survey. |

*First Period.*

Christopher Saxton (died circa 1596) was the first British cartographer who made maps of counties. His main survey work was done 1574—1579. John Norden (1548—1626) and John Speed (1555—1629) followed him. These three men were the fathers of British cartography. Their maps were embodied in the foreign atlases and in the large volumes of combined history and geography which were fashionable throughout the 17th and 18th centuries. During this period the delineation both of natural features and roads improved.

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[a] See *Maps*, page 59.

[b] See *Carto-Bibliography*, page 15.

Ogilby's "Britannia," 1676, gives special road traverses. Those leading out of London are reproduced by the London Topographical Society, 1911.

The prime meridian passes through the Canary Islands or the Azores.

*Second Period.*

Senex, Moll, Morden, are leading names early in the 18th century. Their work is inferior to that of Saxton, Norden, and Speed, but roads are a great feature. Bowen's Atlas, 1760, is specially noteworthy as a fine combination of maps and letterpress.

The prime meridian of this period passes through St. Paul's, London.

*Third Period.*

In this period British cartographers abound; Cary is one of the most interesting and prolific in the earlier part. The "industrial revolution" had begun—canals, turnpike roads, and railways made urgent demands on cartography. In the 19th century private enterprise became insufficient, and in 1801 the Ordnance Survey issued its first sheet.[a] The scale was one inch to a mile. The 6-inch scale was adopted for Ireland in 1824 and for England in 1840. In 1851 a Committee of the House of Commons recommended the abolition of the 6-inch, but science set up such a cry that not only was the 6-inch retained but the 25-inch added a few years later, and towns over 4,000 population were to be given maps on a scale of 1/500.

With the establishment of the Ordnance Survey, Greenwich became the prime meridian of the British Isles.

## BRITISH ISLES.

(References are to notes on maps and cartographers, page 27.)

| | | | | |
|---|---|---|---|---|
| 49 | | ***Ptolemy,[1] 2nd (c) A.D.** | | Re-plotted 1490 |
| 50 | | ***Matthew Paris[2]** | | From *Historia Minor* |
| 51 | | ***Britain,[3] 1300 (c) (1875)** | | Facsimile by O.S. |
| 52 | | **French Calendar,[4] 1500 (c)** | | From a block-book |
| 53 | (A) | **Mercator,[5] 1550 (c)** | $16\frac{1}{16} \times 12\frac{5}{8}$ : 50 m. = 1″ | |
| | (B) | | Ditto | For two French eds. of his *Atlas* |
| 54 | (A) | **Ortelius,[6] 1575** | $19\frac{1}{2} \times 13\frac{1}{2}$ : 40 m. = 1″ | For Dutch and Latin eds. |
| | (B) | | Ditto | Re-engraved for French and Latin eds. |
| | (C) | **1595** | $19\frac{13}{16} \times 14\frac{3}{8}$ : $37\frac{1}{2}$ m. = 1″ | |
| | (D) | | $20 \times 15\frac{1}{2}$ : 40 m. = 1″ | Engraved by P. Keer |
| 55 | | ***Ryther's Tables[7]** | | |
| 56 | (A) | **Blaeu,[8] 1630** | $21\frac{1}{2} \times 18\frac{1}{16}$ : 45 m. = 1″ | Views, plans & costumes |
| | (B) | | $19\frac{5}{8} \times 15\frac{1}{4}$ : 45 m. = 1″ | Dutch text on back |
| | (C) | | Ditto | Without text on back |

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[a] The beginnings of the O.S. may be traced to the Highland rebellion of 1745 when the Quartermaster-General to the Forces of the D. of Cumberland made a map of the Highlands which proved so useful that it was extended to the Lowlands, and the intention was formed of making a map of the whole kingdom.—*Hinks.*

| | | | | |
|---|---|---|---|---|
| 57 | (A) | **Hondius,[9] Henricus, 1631** | $20\frac{1}{8}\times14\frac{15}{16}$ : 43 m. = 1″ | Without text on back |
| | (B) | | Ditto | For Fr. and Germ. eds. |
| 58 | | **Janssonius Joannes, 1640** | $21\frac{5}{16}\times16\frac{13}{16}$ : 40 m. = 1″ | From *Novus Atlas* (1647) |
| 59 | (A) | **Sanson,[10] 1665** | $20\frac{1}{2}\times16\frac{1}{8}$ : 46 m. = 1″ | |
| | (B) | **1677** | $20\frac{7}{16}\times16\frac{1}{16}$ : 46 m. = 1″ | Eng. by Giorgio Widman |
| | (C) | **1692** | $34\frac{9}{16}\times21\frac{11}{16}$ : 33 m. = 1″ | Imp. of H. Jaillot |
| 60 | (A) | **de Wit, F., 1693 (c)** | $23\frac{1}{4}\times19\frac{1}{2}$ : 30 m. = 1″ | Cathedral towns gilt marked |
| | (B) | | Ditto | Additions and imp. of Covens and Mortier |
| 61 | | **Visscher, Nicolas, 1695** | $22\frac{5}{16}\times18\frac{11}{16}$ : 35 m. = 1″ | |
| 62 | | **Nolin, J. B., 1698** | $23\frac{11}{16}\times19\frac{1}{8}$ : 30 m. = 1″ | |
| 63 | | **de Fer, N.,[11] 1705** | $13\frac{1}{8}\times8\frac{3}{4}$ : 80 m. = 1″ | |
| 64 | (A) | **Homann, 1729** | $21\frac{7}{8}\times18\frac{3}{4}$ : 33 m. = 1″ | Long. from I. of Ferro |
| | (B) | **1749** | $21\frac{1}{16}\times18\frac{3}{8}$ : 40 m. = 1″ | Lat. and long. corrected |
| 65 | | **le Rouge, 1744** | $24\frac{7}{8}\times19\frac{3}{8}$ : 36 m. = 1″ | |
| 66 | | **Lotter, Conrad, 1764** | $22\frac{1}{2}\times19\frac{3}{16}$ : $37\frac{1}{2}$ m. = 1″ | |
| 67 | | **Sayer, Robt., 1772** | $24\frac{1}{16}\times18\frac{3}{4}$ : 32 m. = 1″ | Prime meridian through London |

## ENGLAND.

| | | | | |
|---|---|---|---|---|
| 68 | | **Mercator, 1550 (c)** | $18\frac{1}{4}\times14$ : 31 m. = 1″ | |
| 69 | | **Camden, 1637** | $12\frac{5}{8}\times10\frac{13}{16}$ : 37 m. = 1″ | Eng. by Wm. Hole |
| 70 | | **Janszoon, Jan, 1646 (?)** | $19\frac{9}{16}\times15\frac{3}{16}$ : 26 m. = 1″ | |
| 71 | | **Sanson, N., 1665** | $19\frac{7}{8}\times16\frac{11}{16}$ : 26 m. = 1″ | Imp. of Pierre Mariette |
| 72 | | **de Wit,[12] 1688 (c)** | $22\frac{5}{8}\times19\frac{9}{16}$ : $17\frac{1}{2}$ m. = 1″ | |
| 73 | | **Nolin., J. B.,[13] 1688 (c)** | $23\frac{3}{8}\times17\frac{5}{8}$ : 24 m. = 1″ | |
| 74 | | **Moxon, J., 1691** | $22\frac{5}{16}\times19\frac{1}{16}$ : 27 m. = 1″ | Principal roads |
| 75 | | **de Wit, F., 1693** | 14 m. = 1″ | In 3 sheets |
| 76 | | **Coronelli, P., 1696** | 15 m. = 1″ | In 2 sheets |
| 77 | | **Senex, J.** | $24\times20$ : 21 m. = 1″ | |
| 78 | | **Homann, Joh. Bapt., 1729-49** | $22\frac{5}{16}\times19$ : 20 m. = 1″ | |
| 79 | | **Foster, George,[14] 1737** | $22\frac{1}{4}\times20\frac{1}{4}$ : 16 m. = 1″ | |
| 80 | | **le Rouge, 1745** | $22\frac{7}{16}\times19$ : 20 m. = 1″ | |
| 81 | | **Robert, 1753** | $20\frac{1}{4}\times18\frac{7}{8}$ : 20 m. = 1″ | |
| 82 | | **Kitchen, Thos., 1760 (?)** | $18\frac{11}{16}\times15\frac{3}{4}$ : 23 m. = 1″ | |
| 83 | | **Bowen, T., 1760 (?)** | $12\frac{11}{16}\times8\frac{3}{4}$ : 45 m. = 1″ | For *The Complete English Traveller* |
| 84 | | **Lotter, Conrad, 1764 (c)** | $22\frac{5}{8}\times19\frac{5}{16}$ : 20 m. = 1″ | |
| 85 | | **Bonne, 1771** | $16\frac{1}{4}\times11\frac{7}{8}$ : 36 m. = 1″ | |
| 86 | | **Vaugondy, 1778** | $8\frac{11}{16}\times9\frac{1}{2}$ : 45 m. = 1″ | |
| 87 | | **Dilly and Robinson, 1785** | $13\frac{3}{4}\times12\frac{11}{16}$ : 28 m. = 1″ | For Guthrie's *New System of Geography* |
| 88 | | **Rocque, John, 1794** | 11 m. = 1″ | In 2 sheets, for Robt. Sayer, with imp. of Laurie & Whittle |
| 89 | | ***Luffman, John,[15] 1804** | $16\frac{1}{16}\times14$ : 38 m. = 1″ | |
| 90 | | **Smith, C., 1808** | $22\frac{3}{16}\times18$ : 20 m. = 1″ | Turnpikes and navigable waterways |
| 91 | | **Knight, 1844** | $15\frac{5}{16}\times12\frac{1}{2}$ : 26 m. = 1″ | Railways and canals |
| 92 | | **England & Wales,[16] 1845 (c)** | $9\frac{3}{4}\times8$ : 41 m. = 1″ | |

## ENGLISH COUNTIES.

It is not possible to show more than a few typical maps of counties issued by the various publishers and engravers. The references to size, scale, etc., can therefore only be made in a general way, but fuller information may be obtained from the exhaustive study of the Hertfordshire and Cambridge maps made by Sir H. George Fordham.[a] The author has kindly presented copies of these Catalogues to the University, and, during the Exhibition, these may be consulted on application.

| | | | |
|---|---|---|---|
| 93 | **Norden, John**[17] | 2 m.=1″[b] | Middlesex. |
| 94 | **Camden, 1607** | 3¼ m.=1″ | Berkshire, after Saxton, by Hole. |
| 95 | **Camden, 1610** | 3½ m.=1″ | Bucks., Oxon., after Saxton, by Hole.<br>Surrey, after Norden, by Kip.<br>Wilts., by Kip. |
| 96 | **Speed, 1610-11** | 3 m.=1″ | Wilts., Northumberland. |
| 97 | **Camden, 1637** | 3½ m.=1″ | Berks., Oxon., Northumberland, after Saxton, by Hole.<br>Cumberland, after Saxton, by Kip. |
| 98 | **Janssonius, Joannes, 1646** | 2½ m.=1″ | Kent, Gloucester, Northants., Derby, Stafford, Middlesex, and Herts; from various folio editions. |
| 99 | **Blaeu, Johannes, 1648** | 2¼ m.=1″ | Herts., Notts., Westmoreland, Huntingdon, Durham, I. of W.; from various publications. |
| 100 | **Stent, Peter, 1665** (?) | 2 m.=1″ | Herts., Surrey, Worcester; probably from Saxton: imp. of J. Overton. |
| 101 | **Hollar, W., 1666** | 2¾ m.=1″ | Berks.; sold by J. Overton. |
| 102 | **Blome, R., 1673** | 3 m.=1″ | Cambs., Bedford; roughly drawn, but much detail. |
| 103 | **Ogilby,**[18] **1675** | | Roads out of London. |
| 104 | **Speed, 1676** | 2½ m.=1″ | Herts., Northumberland, Middlesex, Oxford, Wales; reprint of 1611 or later editions, sold by T. Basset and R. Chiswell. |
| 105 | **Blome, R., 1689** | 6½ m.=1″ | Lancs., Cheshire, Yorks.; eng. by R. Palmer; re-issue of 1681 Atlas. *Speed's Maps Epitomiz'd.* |
| 106 | **Saxton, 1689** (c) | 4 m.=1″ | Lancs., Oxford, Bucks. and Berks., Hants.; by Philip Lea. |
| 107 | **Morden, R., 1695** | 4 m.=1″ | Northumberland, Berks.; from Camden's Brit.; much detail. |
| 108 | **Speed, 1713-4** | 2¼ m.=1″ | Middlesex, Durham, Salop, Kent, Notts.; sold by Henry Overton. |
| 109 | **Moore, Jonas, 1715** (c) | 2½ m.=1″ | Cambridge. |

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[a] i. Hertfordshire maps: a descriptive catalogue of the maps of the County, 1579—1900 (1907); Supplement (1914).

ii. Cambridgeshire maps: a descriptive catalogue (1908).

[b] Scale refers to first map only.

| | | | |
|---|---|---|---|
| 110 | **Senex, J., 1723 (?)** | 4 m.=1″ | South-east England; re-eng. Norden, 1598, and re-issued by J. Garnett, 1737. |
| 111 | **Moll, H., 1724** | 3½ m.=1″ | Herts., Oxford; from *A New Description of England and Wales.* |
| 112 | **Hinton, J., 1750-1** | 8½ m.=1″ | Gloucester; for *Universal Magazine.* |
| 113 | **Kitchen, 1751** | 10 m.=1″ | Gloucester: for *London Magazine.* |
| 114 | **Bowen, E., 1760 (c)** | 3¼ m.=1″ | Lancs., Derby., W. Riding, Cumberland, and Westmoreland; from *A Large English Atlas.* |
| 115 | **Kitchen, 1764** | 7½ m.=1″ | Cheshire, Oxford, Dorset: for *England Illustrated.* |
| 116 | **Donn, 1765** | 1 m.=1″ | Devon; eng. by T. Jeffreys. |
| 117 | **Ellis, 1676** | 8½ m.=1″ | Gloucester; from Ellis' *English Atlas.* |
| 118 | **England Display'd, 1769** | 5 m.=1″ | Herts., Derby, Staffs., Westmoreland; eng. by J. Rocque. |
| 119 | **Hogg, 1784** | 12 m.=1″ | Cumb. and West., Northumberland. |
| 120 | **Harrison, John, 1791** | 2½ m.=1″ | Cambs., Lincs., Cumb. and West., Derbys. |
| 121 | **Newcome, Peter, 1794** | 2¼ m.=1″ | Hertfordshire. |
| 122 | **Stockdale, 1798 (c)** | 1½ m.=1″ | Middlesex, Kent. |
| 123 | **Smith, C., 1801-4** | 2½ m.=1″ | Oxford, Northumberland. |
| 124 | **Cary, John, 1805** | 4 m.=1″ | Northumberland. |
| 125 | **Baugh, R., 1808** | 1 m.=1″ | Shropshire. |
| 126 | **Cary, J., 1807** | 3½ m.=1″ | Northumberland. |
| 127 | **Dix, Thos., 1816** | 3½ m.=1″ | Bucks. |
| 128 | **Edwards, 1817** | | Trigonometrical land chart. |
| 129 | **Wilkes, J., 1818** | | Gloucester; for the *New British Traveller.* |
| 130 | **Neele, S. J., 1822** | 2½ m.=1″ | Turnpikes bet. Leeds and Doncaster. |
| 131 | **Pigot, J., 1825-30** | 6½ m.=1″ | Lancs., Cheshire, Derbys., Yorks. |
| 132 | **Bryant, 1822-9** | ⅔ m.=1″ | Herts., Suffolk, E. Riding, Norfolk, Oxford. |
| 133 | ***Greenwood, 1826** | 1 m.=1″ | Hampshire. |
| 134 | **Greenwood, 1834** | 3 m.=1″ | Oxford; eng. by J. and C. Walker. |
| 135 | **British Gazetteer, 1852** | 2 m.=1″ | Huntingdon. |

## SCOTLAND.

| | | | |
|---|---|---|---|
| 136 | **Pont, T., 1636** | $21\frac{1}{4}\times14\frac{7}{16}$ : 2⅓ m.=1″ | Lothian: in Mercator's *Atlas.* |
| 137 | **Pont and Blaeu, 1630-54** | | From Blaeu's *Atlas.* |
| 138 | **Gordon of Straloch, 1721** | $21\frac{13}{16}\times18\frac{1}{4}$ : 12 m.=1″ | Revised by J. Senex |
| 139 | **Kitchen, Thos., 1778** | $26\frac{1}{4}\times21\frac{1}{8}$ : 12 m.=1″ | Pub. by W. Faden |
| 140 | **Dilly and Robinson, 1785** | $14\frac{1}{2}\times13\frac{1}{4}$ : 24 m.=1″ | Guthrie's *New System of Geography.* |
| 141 | **Wyld, J., 1832** | $43\times37\frac{1}{2}$ : 7 m.=1″ | |

## IRELAND.

| | | | |
|---|---|---|---|
| 142 | ***Nowell, Lawrence, 1570** | $15\frac{1}{2}\times11$ : 20 m. = 1″ | Reprod. of M.S. Map (B.M.) by War Office |
| 143 | ***Ulster** | $22\times17$ : $6\frac{1}{2}$ m. = 1″ | Zinco by Ord. Survey |
| 144 | **Petty, William,[19] 1673** | $22\frac{3}{4}\times17\frac{3}{4}$ : 15 m. = 1″ | Pub. by T. Jeffreys |
| 145 | ***Moll,[20] 1714** | | |
| 146 | ***Taylor and Faden, 1793** | $29\times24$ : 9 m. = 1″ | Eng. by J. Collyer : roads |
| 147 | ***Beaufort, D. A., 1797** | $45\times35$ : 8 m. = 1″ | Prime merid. : Greenwich |
| 148 | ***Allen, M. A. and T. W., 1832** | $31\frac{3}{4}\times29$ : 10 m. = 1″ | |
| 149 | ***Betts, 1748 (?)** | $30\frac{1}{4}\times25\frac{1}{8}$ : 10 m. = 1″ | Railway construction |
| 150 | ***Irish Church Missions, 1852** | $21\times16$ : 20 m. = 1″ | |

## CHARTS OF THE BRITISH SEAS.

These examples of sea charts of the 17th and 18th centuries should be compared both with the "portolani" and the land maps which precede them.

| | | | |
|---|---|---|---|
| 151 | **Janszoon, Jan, 1650 (c)** | $21\frac{3}{4}\times17$ | British coasts |
| 152 | **Loon, H. Van, 1661 (?)** | $34\frac{1}{4}\times24\frac{1}{8}$ | Inset : Chester and Dee estuary |
| 153 | **Collins, Capt. Greenville,[21] 1689** | $22\frac{1}{8}\times17\frac{5}{8}$ | The Narrow Seas |
| 154 | **Sanson, N., 1692** | $31\frac{1}{2}\times23\frac{1}{8}$ | English Channel |
| 155 | **Collins, 1693** | $34\times23\frac{7}{8}$ | Chichester to Poole |
| 156 | **Inselin, C., 1715** | $33\frac{3}{4}\times24\frac{1}{4}$ | British seas |
| 157 | **Moll, H.,[22] 1730** | $10\frac{11}{16}\times7\frac{15}{16}$ | Narrow seas |
| 158 | **Renard, L., 1745 (?)** | $22\frac{3}{8}\times19\frac{1}{2}$ | British seas |
| 159 | **la Rochette, 1794** | $34\frac{3}{4}\times20\frac{1}{4}$ | English Channel soundings and nature of sea floor |

### Notes on Maps and Cartographers.

[1] [**49**] This is one of Ptolemy's 26 maps of special regions and is taken from Nordenskiöld's *Facsimile Atlas.* Five earlier editions are on exhibition at the Rylands Library, viz., Rome, 1478 ; Florence, 1480 ; Ulm, 1482 ; Bologna, 1482 ; Ulm, 1486.

[2] [**50**] Matthew Paris (1195—1259), historian, was a monk of St. Albans. In his histories there are several maps. This is a photograph from the MS. copy of his *Historia Minor* preserved in the British Museum (Cottonian, Claudius, D. vi. fol. 86). The sketch shows the identification of names by Konrad Miller.

[3] [**51**] This is a facsimile, published by the Ordnance Survey in 1875, of the original in the Bodleian Library at Oxford. A short monograph was written by the late Mr. William Sanders, of the Record Office, and published at the same time.

[4] [**52**] This is a small map of the British Isles bound in a French Calendar. The original is on exhibition at the Rylands Library.

[5][**53**] Mercator (Gerhard Krämer, 1512—94), called by Ortelius "nostri sæculi Ptolemæus" and regarded as the founder of modern cartography. The first to use the term "atlas" for a collection of maps.

[6][**54**] Abraham Ortelius (1527—98) commenced by collecting and colouring maps for sale at Antwerp. In 1577 he met Camden while on a visit to the British Isles, and to this visit Camden owes the incentive to carry through his *Britannia*. In 1570 was issued the first (Latin) edition of his *Theatrum Orbis Terrarum*, the same plates being used for reprinting other editions for many years.

[7][**55**] *Ryther's Tables* are ten charts showing the course of the Spanish Armada—*Expeditionis Hispanorum in Angliam vera descriptio, Anno Do.*: MDLXXXVIII. Ryther, one of the earliest English engravers on copper, flourished A.D. 1576—1590. He engraved also some of the plates for the Mariner's Mirror, 1588, the English edition of the first printed collection of sea charts, published in Holland, 1585. In 1736 reduced copies of the Tables were published by Pine—and in 1919 a new edition was issued by the Roxburgh Club.

[8][**56**] *William Janszoon Blaeu* (1571—1638), of Antwerp. William and his two sons, Jan and Cornelis, issued large folio atlases—*Novus Atlas*—with editions in various languages from 1635 onwards. Text for British Isles taken from Camden.

[9][**57**] Henry Hondius, son of Jodocus Hondius, of Amsterdam (1563—1611). The family of Hondius succeeded to the business and stock of the Jansons, who were rivals of the Blaeus.

[10][**59**] *Nicolas Sanson*, of Abbeville (1600—67), the most celebrated of French Geographers; his three sons Nicolas, Guillaume, and Adrien assisted him. To the sons H. Jaillot owed material for his great atlas of 1692, and from a grandson Robert de Vaugondy, the elder, obtained material for the *Atlas Universel* of 1757. Sanson published more than 300 maps. For the British Isles, the Sanson maps based on Camden, Saxton, Speed, Pont, and Gordon.

[11][**63**] From *Petit et Nouveau Atlas, Paris*, 1705; no meridians nor longitudes shown, but London stated to be long.: 18° 22′ 20″ E.

[12][**72**] "A New Mapp of the Kingdome of England," printed and given out by Nicolas Visscher and sold by John Overton at London. Shows the cathedral towns in gilt; principal roads, and the distances between towns by a system of radial lines.

[13][**73**] By P. Coronelli and revised by Tillemon. The map is dedicated to James II. It gives particulars of dioceses, cities, towns, parishes, castles, parks, forests, rivers, and bridges.

[14][**79**] Stated to be an improvement on Senex, Moll, and others and to give roads not found in Ogilby's Survey. Shows cities, boroughs, market towns, direct and principal cross roads and post towns.

[15][**89**] "A map to illustrate the threatened invasion of England by Napoleon." Gives "a complete representation of the coast of England, together with the Interior, divided into Counties and Military Districts. Also the coasts of France and Holland from the Texel to Brest, with the bearings from London and the distance, in

miles, from port to port. To which is annexed eighteen plans of the ports of the enemy, the principal depots of the flotilla intended for the invasion of England."

[16][**92**] Shows counties, roads, markets, and places with more than 100 houses. Railways have been added, but no reference is made in the key.

[17][**93**] Norden was the first Englishman who designed a complete series of county histories. In 1596 he published a " Preparative " to his *Speculum Britanniæ*; in 1607, his " Surveyor's Dialogue." Norden's latest published work as a topographer was " England, an intended Guyde for English Travellers," 1625, a series of distance tables intended to be used with Speed's set of county maps.

[18][**103**] Towards end of the 17th century appeared John Ogilby's *Britannia*—a set of folio drawings of the roads of England and Wales, arranged in strips, constructed from measurements with the wheel or perambulator on the basis of the statute mile which then replaced the old British mile—the pre-Roman Gallic *leuga* of 1,500 Roman paces or 2,200 modern metres as compared with 1760 yards or 1,609 m. Ogilby's work laid the foundation of the long series of British and Irish Road-books, which continued to appear up to the period when traffic was largely diverted to our railways about 1850. See *Maps*, page 16.

[19][**144**] The following notes are taken from a paper by Mr. Michael C. Andrews, read before the Belfast Natural History and Philosophical Society, December 12th, 1922.

1654, Petty's proposals for a survey of forfeited lands in Ireland agreed to, and he was authorised to make a survey and plot on a map the whole of Ireland. This he undertook to do in thirteen months if " The Lord gave reasonable weather and due provision be made against Tories, and that my-instruments be not made to stand still for want of bounders."

After the survey, he undertook the distribution of the forfeited lands to the adventurers and soldiers who were to be paid in land instead of money.

The survey was made entirely by chain (note that the map has no meridians). Authentic copies of the map were accepted in the law courts, and according to Sir Thomas Larcom in 1851, they then constituted the legal record of the title on which half the land of Ireland was held.

[20][**145**] A new map of Ireland—according to Sir W. Petty (but supplied with many additions . . .), divided into its Provinces, Counties, and Barronies, wherein are distinguished not only the Bishopricks and Boroughs but also all the Bogs, Passes, Bridges, etc., which are in Sr. W(illiam) P(etty's) 32 county maps. To . . . William and Mary . . . dedicated by . . . P. Lea and H. Moll.

[21][**153**] Captain Greenville Collin's maps were published in 1689 and 1693 under the name of " Great Britain's Coasting Pilot." There was a further edition printed in 1781.

[22][**157**] Shows " the winds which will serve to come and go from England, Holland, France, and Flanders."

# Section III.

# London and Paris (Mills Collection).

The maps and charts described in previous sections arose from various causes. The Greeks were philosophers seeking after truth. The Romans and Chinese were empire builders: to them maps were tools in the art of government, in secret diplomacy, and war. In the Dark Ages maps were largely theological. The "Portolani" were made merely for navigation. The world maps of the Age of Discovery were, like those of the Romans and Chinese, mainly empire-building tools.

About the middle of the 16th century, with the progress of printing and engraving, maps came into general use for trade and for learning, for travellers by land as well as by sea.

Town maps, in the case of fortified towns, may have arisen from military reasons—but in most cases artistic motives were involved. The maps and "views" were engraved by the same artists. The later large-scale maps must have been useful in "real estate" transactions; and, in the case of Ogilby and Morden, the survey of the part of London destroyed by the fire was a necessity and was made by order of the Corporation of London.

In the reports of the Commissioners of Woods and Forests will be found plans of alterations proposed in London at the beginning of the 19th century. The proposal in 1812 to cover Regent's Park with villas was fortunately not approved. The Park was originally a deer forest belonging to the Crown. It was known as "Marybone Park" and its area was about 550 acres. Charles II., soon after the Restoration, granted a lease for 65 years at an annual rent of £36. 14s. 6d. to Henry Bennett (1681—1685), created Earl of Arlington, 1663. The property passed through various hands till 1811, when the leases fell in and the Crown resumed full possession.

In 1810, October 8th, the Commissioners of Woods and Forests called for reports from Leverton and Chauner, Architects to the Land Revenue Department, and John Nash, Architect to the Woods and Forest Department. On July 4th, 1811, the two firms sent in their reports each with a plan [181 and 182]. On October 18th, 1811, the Treasury refused to approve of either plan—except of some of the roads and planting proposed by Nash.

On March 6th, 1823, the Commissioners refer to a plan copies of which "now considered to be finally settled have been taken by the Lithographic Press." They direct that a copy of this plan is to be annexed to each lease of a building fronting the park. This is the plan dated March 10th, 1823 [185].

In 1826, May 6th, the Commissioners' Report contains, as Appendix No. 22, the Regent's Park Estate, and as Appendices No. 23 and 24, the plans of Charing Cross Improvements [186, 187, and 188].

Disraeli, who was a Londoner all his life, is very severe in his novel *Tancred* (pub. 1847) on the town planning of his boyhood:

> "Though London is vast it is monotonous. All these new districts which have sprung up within the last half-century, the creatures of our commercial and colonial wealth—it is impossible to conceive anything more tame, more insipid, more uniform. Pancras is like Mary-le-bone, Mary-le-bone is like Paddington; all the streets resemble each other; you must read the names of the squares before you venture to knock at a door.
>
> Mary-le-bone alone ought to have produced a revolution in our domestic architecture. It did nothing. It was built by Act of Parliament—Parliament prescribed even a façade. It is Parliament to whom we are indebted for your Gloucester Places, and Baker Streets and Harley Streets and Wimpole Streets, and all those flat, dull, spiritless streets, all resembling each other, like a large family of plain children, with Portland Place and Portman Square for their respectable parents."

## LONDON.

(Those marked † published by the London Topographical Society.)

**160. †WYNGAEDE, VAN DER, 1550 (c).** 120×17.

Usually attributed to 1550, but Gomme suggests a date early in 16th century.[a] The original drawing is in the Sutherland collection in the Bodleian Library. Note London Bridge and the view of Suffolk House, Southwark, a contemporary picture of a Tudor House.

**161. †HOEFNAGEL, 1572.** 34×24.

Reproduced from Braun and Hogenberg's *Civitates Orbis Terrarum*, 1572. Internal evidence shows the date of the map to be 1558—1561. The costume of the figures in the foreground and the buildings west of Temple Bar are early Elizabethan.

**162. †AGAS, 1561—1576.** 74×29.

St. Paul's appears without a spire; the spire was destroyed in 1561. The date of the map is thus given as between 1561 and 1576. Note the district now known as Seven Dials with the figures of pedestrians, cattle, and women drying clothes. "The Waye to Vxbridge" is Oxford Street. Between Chancery Lane and Holborn Bars is Southampton House, the residence of Shakespeare's patron.

Collected from originals in City of London Library and Pepysian Library, Magdalene College, Cambridge.

**163. †NORDEN, 1593.** 22×10.

The City of London and of Westminster from Norden's *Speculum Britanniæ.* Gray's Inn Lane leads through the country to Hampstead. The village of Islington is isolated. The map is interesting as showing London in Shakespeare's time.

**164. †VISSCHER, 1616.** 96×24.

A copy of the original edition is in the British Museum. Shows Whitehall, St. Paul's Cathedral, the Bear Garden and Globe after it was re-built, the Bridge, the Tower, and St. Olafe.

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[a] Story of London Maps—*Geographical Journal*, xxxi., page 616.

**165. †HOLLAR, 1647.** 96×24.

From the original "view" published in Amsterdam. The finest representation of London before the Fire.

**166. †HOLLAR, 1648 (c).** 24×17.

Bird's-eye view of West Central London, from original in British Museum. A curious pyramidal tower marked "Ye Waterhouse" just eastwards of landing stage of Strand Bridge is one of the works set up during the Protectorate for pumping the river water for public service.

**167. †FAITHORNE AND NEWCOURT, 1658.** 70×46.

One most interesting relic of the time, depicted in Faithorne's map, when the now densely-populated district near Soho was in quite a rural condition, is still in existence. In Archer Street, facing the rear of the Lyric Theatre, stands a farmhouse (now occupied by a firm of upholsterers and art-fringe makers). This is said to be the farmhouse of Windmill Fields. These fields, like the present Great Windmill Street, derived their name from the windmill which is shown in Faithorne's map.—*Gomme.*

**168. †PORTER, 1660—1665.** 34×19.

The latest map before the Great Fire in 1666. From original in the Library of Society of Antiquaries. London in the time of Milton.

**169. †MOORE, 1662.** 26×22.

River Thames from Westminster to the Sea. From original in H.M. Office of Works.

**170. †HOLLAR, 1667.** 31×21.

Showing Great Fire of London.

**171. †OGILBY AND MORGAN, 1682.** 96×60.

Based on the first scientific survey of City of London; made by Ogilby in 1666–76 and published by Morgan, 1677. Scale, 1 : 1,200. Survey extended by Morgan, published in 1682. Scale, 1 : 3,600.

**172. [a]PITTS, J., 1700 (c).** $13\frac{7}{8} \times 13\frac{7}{8}$.

A New Map of Twenty Miles round London.

**173. †KIP, 1710.** 80×48.

View of London—Westminster and St. James's Park, taken from Buckingham Palace.

**174. †ROCQUE, 1746.** 156×81.

Covering about $8\frac{1}{2} \times 4\frac{1}{2}$ miles on scale 1 : 2,400.

**175. [a]KITCHEN, THOS.** $11\frac{11}{16} \times 9\frac{3}{4}$.

A new map of the counties Ten Miles round the Cities of London and Westminster and the Borough of Southwark.

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[a] Booker Collection.

176. **TARDIEU, 1780.**

London and Southwark.

177. **CARY, 1800.** 36×29.

Country 15 miles round London.

178. **MOGG, 1823.** 38×24.

London and surrounding villages.

179. **WYLD, 1842.** 42×29.

London, Westminster, and Southwark.

180. **UNDERGROUND, 1919.**

"Tired of London." (New London in an old garb.)

## TOWN PLANNING SCHEMES, LONDON, 1812–1830.

181. **NASH, JOHN, 1812.** Marybone Park Farm.

182. **LEVERTON AND CHAUNER, 1812.** Marybone Park Farm.

183. **REGENT'S CANAL, 1812.**

184. **CHARING CROSS TO PORTLAND PLACE, 1812.**

185. **REGENT'S PARK, 1823.**

186. **REGENT'S PARK, 1826.**

187. **CHARING CROSS, 1826.** Improvements.

188. **CHARING CROSS, 1826.** Property to be purchased.

189. **CHARING CROSS TO BRITISH MUSEUM, 1826.**

190. **THE STRAND, 1826.**

191. **ST. JAMES'S PARK, 1830.**

## PARIS.

The French Government have had reproduced a series of old maps of Paris (A.D. 1530—1842), published by A. Taride, Paris, 1910.

(They are marked ‡ in the following list.)

**192. ‡D'ARNOULLET, 1530.** 20×13.

Known as *Plan aux Tros-Anges*, because of the figures depicted on it. Probably the oldest plan of Paris extant.

**193. ‡BRAUN, 1530.** 30×22.

Known as *Plan aux Trois-Personnages* from the three figures—a noble and two ladies in the costume of the time of Charles IX. From *Civitates Orbis Terrarum*, pub. by George Braun at Cologne, 1572. Cp. London.

**194. ‡TRUSCHET AND HOYAU, 1551.** 52½×38.

Paris in the reign of Henry II. from the copy in the *Bibliothèque de Bâle.*

**195. ‡SAINT-VICTOR, 1555.** 40×30.

From the copy in the Library of the Abbey of Saint-Victor. Unlike the previous maps this is somewhat roughly engraved and was produced for commercial purposes.

**196. ‡MÉRIAN, 1615.** 42×24.

From the copy in the Bibliothèque Nationale. This is interesting, because it has on it figures showing the costumes of the period in France.

**197. ‡GOMBOUST, 1652.** 62½×54.

Dedicated to Louis XIV. This is the first published survey (Plan géométral), though the buildings are shown in elevation.

**198. ‡ROCHEFORT, 1675.** 68×56½.

Paris and its environs. From a copy in the collection of the Duc de Choiseul in the possession of M. Victor Perrot. Valuable because of the scenes depicted.

**199. RAM, 1700.** 24×20.

Street Plan.

**200. ‡BULLET, 1710.** 70×69.

Revised with additions by Jaillot (fils) from copy in collection of M. E. Mareuse.

**201. COVIENS, 1730.** 30×22.

Street plan by Guillaume de l'Isle.

**202. ‡DELAGRIVE, 1737.** 36×28.

Published in *Traité de Police* of De la Mare. Shows the boundary of the town and extent of the suburbs.

**203. ‡TURGOT, 1739.** 105×83.

Paris at the time of Louis XV.

**204. DELISLE, 1745.** 25×19.

Street plan.

**205. LATTRE, 1774.** 25⅜×21¼.

A street map of Paris.

**206. TARDIEU, 1787.** 24×16½.

Street plan, showing specially the growth of the city and extension of the fortifications.

**207. JEAN, 1802.** 31½×21½.

Shows streets and municipal divisions.

**208. ‡MAIRE, 1808.** 48×36.

Detailed plan of the town and suburbs.

**209. ‡VICQ, 1842.** 41×28.

Paris under Louis Philippe.

# Section IV.

## Regional Maps (Mills Collection).

It is not possible to give more than a list of a selected few of the Regional Maps. The Collection of Far East maps is very extensive, but has not yet been fully catalogued.

### EUROPE.

210. **ITALY—NORTH, 1515.**[a]
211. **MEDITERRANEAN SEA, 1738.**
212. **GERMANY, 1740.**
213. **NUREMBURG.**
214. **SEA OF MARMORA, 1793.**
215. **FRANCE—NORTH, 1793.**
216. **FRANCE—CARTOON.**
217. **SAXONY.**
218. **SWITZERLAND, 1813.**
219. **FRANCE, 1814.**
220. **EUROPE, 1815.**
221. **ITALY, 1816.**
222. **ITALY—NORTH, 1816.**
223. **SWITZERLAND, 1817.**
224. **GERMANY. 1826.**
225. **SWITZERLAND, 1833.**
226. **SWEDEN AND NORWAY, 1838.**
227. **RHINELAND.**
228. **GERMANY 1847.**
229. **FRANCE, 1870.**
230. **EUROPE—CARTOON, 1877.**
231. **BALKANS, 1878.**

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[a] Published 1515 to illustrate Jacques Signot's guide to the ways and passages from France into Italy, written in connection with the movements of the French Armies in the wars which Charles VIII. and Francis I. carried on in the latter country. See *Maps*, page 25.

## NORTH ASIA AND THE FAR EAST.[a]

**232. CHINA—Rubbing A, 1137.[b]**
**Rubbing B, 1137.**

**233. CATALAN WORLD-MAP —EAST, 1375.**

**234. TARTARY, 1657, from the Atlas of J. Jansson.**

**235. GODUNOFF, SIBERIA—Swedish Version, 1667.[c]**

**236. GODUNOFF, SIBERIA—Russian Version, 1672 (?).**

**237. REMEZOFF, Ethnographical map of N. Asia, 1673.[d]**

**238. REMEZOFF, Map of the Waterless Steppe, 1696.**

**239. REMEZOFF, Northern Asia, 1696.**

**240. RENAT, Kalmuk map of Sungaria,[e] pre-1733.**

**241. RENAT, Kalmuk version of a Chinese map of Central Asia, pre-1733.**

**242 CHINA—D'ANVILLE, 1732.**

**243. TARTARY AND TIBET—D'ANVILLE, 1734.**

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[a] For a valuable study of early maps of this region, see *Russia, Mongolia, China*, by John F. Baddeley, 2 vols., 1919.

[b] These rubbings are from stones engraved in A.D. 1137, and preserved at Si-ngan-fu, in North China. Both stones were engraved in that year, but the map shown in Rubbing (A) was probably drawn between A.D. 1043—1050, the map in Rubbing (B) shortly before the engraving.

These rubbings are described in a monograph by the late Monsieur Edouard Chavannes, who was a member of the French Academy, and the leading authority on Chinese Archæology. He made more than one expedition to the interior of China. Monsieur Chavannes dated the earlier map on grounds the full force of which cannot be properly estimated without some acquaintance with Chinese literature and history. Comparison with modern maps shows that Chinese maps in the 12th century were better than their European contemporaries, and that they were nearly, if not quite, as good for China as Ptolemy had been for Europe a thousand years before. Fortunately, too, their horizon prevented them from conjecturing Europe, or they might have come off worse even than Ptolemy when he conjectured India and China.

[c] Tsar Alexei Mikhailovich in 1666 ordered his chief representative in Siberia, Godunoff, voevoda of Tobolsk, to supply a map of Northern Asia. The original is lost, but Cronman—a Swede—made a copy, 1669. Cronman, whose copy is kept in the Stockholm Archives, says, " They showed me the map of all these countries and of Siberia as far as China sent recently in accordance with His Majesty's ukase by the voevoda of Tobolsk, Godunoff, and I took a copy, having received permission to keep the map by me for one night."

[d] Remezoff was ordered by the Tsar in 1698 to draw new maps of Siberia after the model of 1697 or 1698. This atlas in its original form is in the Rumiantseff Museum, Moscow; reproduced in facsimile, 1822.

[e] In 1734, a Swede, Johan Guslov Renat, who had been taken prisoner at Pultava, exiled to Siberia, and there captured by the Kalmuks, came back at last to his native land, bringing with him two maps of Middle Asia.

244. Number of Maps engraved for Oriental Translation Fund of, Great Britain and Ireland, 1832.

245. CENTRAL ASIA, 1834.

246. SUNGARIA, excerpt from Klaproth's map, 1836.

247. ASIA, 1838.

248. INDIA, 1857.

249. INDIA, 1862.

250. SUNGARIA, excerpt from the Kien-lung Jesuit Map, 1862.

251. SUN-ON (Kwantung Prov.), 1868.

252. CHINA—WYLD, 1870.

253. Number of Trans-Frontier Maps of Great Trigonometrical Survey of India, 1873.

254. CANTON PROVINCE, 2 m.=1″, 1879.

255. TOKIO—JAPANESE MAP, 1882.

256. NORTH-EAST CHINA—RICHTHOFEN, 1885.

257. TOKIO—JAPANESE MAP, 1886.

258. Number of large-scale Russian Maps of Far East, 1887–92.

259. SHANTUNG, 1 : 650,000, 1898.

260. PLAN OF TÊ-SHÊNG-SHA, HOIKOW, HAINAN I., 1898.

261. PROVINCES OF CHINA (Chinese Map), 1905.

262. Distribution of Christian Population in China, 1911.

263 and 264. TWO CHINESE MAPS.

## NORTH AMERICA.

265. SPEED, 1626.

266. ALEXANDER, 1630, reduced facsimile from "Encouragement to Colonies."

267. MITCHELL, 1755, 22 m.=1″. BRITISH AND FRENCH DOMINIONS.

268. MONTRESOR, 1768, 6 m.=1″. NOVA SCOTIA.

269. FADEN, 1777, 7 m.=1″. NEW JERSEY.

270. FADEN, 1783. UNITED STATES.

## MEXICO.

Series of Maps from "The True History of the Conquest of New Spain," Hakluyt Society, 1908–16.

271. **MAGUEY PLAN.** A pre-Spanish plan of part of the City of Mexico (reduced).

272. **MAGUEY PLAN.** Reproduced from a photographic print on which outline strengthened.

273. **SAVORGNANI, 1524.** Chart of the Gulf with plan of the Lake and City of Mexico from the Latin translation of Cortes' *Letters* by Pietro Savorgnani.

274. **ALONZO DE STA. CRUZ, 1560** (c). Facsimile of map of the Valley of Mexico from original MS. preserved in the University of Upsala.

275. **MARTINEZ, 1628** (c). Map of the Valley of Mexico from original at Seville.

276. **ANTOINE, 1772.** Plan de la ville de Mexico, reproduced by Joubert, Paris.

277. **MEXICO CITY AND VALLEY, 1520** (c). Conjectural.

278. **MEXICO CITY AND VALLEY.** From recent surveys.

## AFRICA.

279. **LAURIE, 1800.**

280. **CENTRAL AFRICA, 1887.**

281. **SOUTH AFRICA, 1894.**

282. **TRANSVAAL REPUBLIC, 1899 (by Jeppe), 7½ m.=1".**

## AUSTRALASIA.

283. **NEW ZEALAND. Chart by Capt. Cooke, 1771.**

284. **NEW ZEALAND—CANTERBURY, 1856.**

285. **ADMIRALTY CHART, 1858.**

286. **NEW ZEALAND, 1880.**

287. **NEW SOUTH WALES, 1878.**

# Section V.

A small exhibition of Modern Ordnance Maps, mostly relating to Manchester and District, has been arranged with the help of the Ordnance Survey. The 8 sheets of the 1833–37 survey have been kindly lent by Colonel Henry T. Crook.

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*1874. Beavan, *Mediæval Geography*. An essay in illustration of The Hereford Mappa Mundi. Stanford, London.

*1875. Sanders, Monograph on *Bodleian Map of Britain* (1300 c).

*1888. Miller, Konrad, *Die Weltkarte des Castorius* (Peutinger Table), reduced facsimile. Stuttgart.

*1888. Stevens, *Johann Schöner*. Reproduction of Schöner's globe of 1523, with notes, 6 maps. Stevens, London.

*1889. Nordenskiöld, *Facsimile Atlas*, printed maps (135) of 15th and 16th centuries, large folio. Stockholm.

*1891. Nordenskiöld. Account of a Copy from the 15th century of *A Map of the World*, engraved on metal, preserved in Cardinal Stephan Borgia's Museum at Velletri. This copy is in the John Rylands Library, Manchester.

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